CENTRE FOR BUSINESS, INFORMATION TECHNOLOGY AND ENTERPRISE

Research Report

Impact of Social Media on Social Commerce

Submitted by

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IMPORTANT

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Abstract:

With an enhanced expansion in the e-commerce business, it is easy to become victim to online shopping. Corporations utilise the information given by the consumers to make a revenue for their organisation. Making use of a recommender system in Facebook Commerce (f-commerce) is an entrancing and testing business. In the online business industry, achieving this test needs confronting different issues such as streamlining the searches, updating products, trust, and quality, that disappears in traditional business. Using the data provided from an end-user in their social media websites to consumers' emails and even browsing becomes data for the e-commerce company. With the help of this information, the end-users' data are gathered and turned as recommended products, discounts and many more. In conducting this research, the factors affecting and influencing end-users using social commerce is analysed. An online survey was conducted to analyse the impact of social commerce. This research would examine the role of age, gender, Facebook usage, time on Facebook and online shopping to understand the various factors that result in a recommender system. There were 202 participants who answered the survey questions varying from the age group of 18 to above 60 years of age who access Facebook and participate in online shopping in New Zealand. The analysis was performed using SPSS from the data derived. Descriptive analysis was performed using the data received from the responses from the survey. From the analysis it was found that end-users opt for social commerce on basis of brand loyalty, trust, efficiency, and compatibility. The age and gender of the end users also plays a role in adapting social commerce.

Keywords: *E-commerce, Facebook, recommender system, social commerce,*

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Glossary:

Clickstreams	Tracking of a click path
Chi-square	Statistical hypothesis test where the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true.
E-commerce	Electronic Commerce is conducting web business.
E-WOM	Electronic Word-of-mouth, such as reviews, ratings.
F-commerce	Facebook Commerce is conducting online business on Facebook.
P-Value	Probability value is the probability of obtaining test results at least as extreme as the results actually observed during the test, assuming that the null hypothesis is correct.
Recommender System	Filtering system that is used to predict and the "rating" or "preference" a user would give to a product.
S-commerce	Social commerce is conducting online business on social media portals.

1 Introduction

The Internet has been compelling for a long time, be it education, business or shopping. Propelled by Internet organisations, for example, Amazon, the Internet has delivered shopping to peoples' doorstep. Electronic commerce or e-commerce has developed as of late, a platform to show the associations' items to the end-users in the most enticingly way. Most customers have deserted their restraint about shopping on the web (Ko, 2018). Most people appear to be open to shopping on the web as opposed to the traditional way.

A recommender system isn't puzzling in the domain of the Internet. Recommender system appears in every industry, whether it is the Airlines websites or Education industry. Customers browsing history to purchasing record is taken into consideration while recommending such information for the customers (Han & Trimi, 2017). Personalized product recommendation is a trend in social commerce. The concept following a recommender system is comprehensively examined and significantly utilised by top enterprises (Salvatori & Marcantoni, 2015). That said, social media is a vast platform for organisations to collect information for a recommender system.

Furthermore, social media is a platform where people feel comfortable to share one's interest. The organisation's turnover from such places uses this information from one's social media accounts to recommend information to consumers. This data gets advertised to one's social media page, which allures customers in participating in social commerce (Friedrich, 2016). Such an advertising strategy is called social commerce. Social media is used by e-commerce, to help with buying and selling stocks and administrations on the web. The extensive use of social commerce in social media platforms is studied worldwide. In this paper, a social media platform, namely Facebook, is used to understand the theory behind the study. Regular usage of social commerce on Facebook is lead to Facebook commerce (f-commerce) to attract consumers and recommend data from the portal (Leong, Jaafar, & Ainin, 2018).

The introduction chapter is followed by the research question and hypothesis, where the objective of this research is explained along with the main research question, and its sub-questions are discussed.

In chapter 3, a literature review is done based on the recommender system, social commerce and f-commerce. This study was conducted by analysing 60 published articles.

In chapter 4, the methodology used to conduct this research is explained. A detailed description of the research design, research method, sampling, target population, sampling size, data gathering, and the limitations is thoroughly discussed.

In chapter 5, a descriptive analysis of the gathered data from an online survey is provided. This data is then executed to calculate the chi-square tests to derive the p-value. A descriptive analysis is conducted in this section concerning the hypotheses.
In chapter 6, the results obtained from the descriptive analysis is discussed, and this concludes the possibility of the hypotheses with regards to the research questions.
In chapter 7, a brief insight about future research in the recommender system, social commerce and f-commerce aspect is provided.
In chapter 8, a conclusion of the research with a summary of the result and its relationship with the individual sections of this report.

2 Research Questions and Hypothesis

2.1 Introduction

This section describes the objective of the research, along with the main research question and sub-question. The hypothesis derived from the research questions is discussed. The hypothesis explains the connection between each variable with each other.

2.1.1 Objective of the research

In this digital era, everything is a click away, and traditional shopping is slowly fading away to make way for its successor of online shopping. Every new aspect comes with its pros and cons. This study analyses the advantages and disadvantages and understands the nature of social marketing. This research also considers the involvement of social media in the current age.

This case study focuses on Facebook to understand its involvement in social commerce

This study thus aims to understand the factors influencing the marketing nature of social commerce and recommender systems. The purpose of this research is to understand the aspects of e-commerce marketing in social media and the recommender systems in e-commerce society concerning Facebook.

2.2 Research Questions

The primary focus of this research is to understand the factors that influence social commerce. Thus, the main research question and its following sub-questions are as follows:

RQ1: “What are the factors that influence a recommender system in social media marketing from an end-user perspective?”

RQ 1.1: How does social commerce benefit end-users?

RQ1.2: How does a recommender system on social media benefit the end-users’?

RQ1.3: What are the factors that affect the recommendation on social media for an end-users?

RQ 1.4: How does a recommender system affect the end-users on social media?

RQ 1.5: How does Facebook contribute to the recommended products for an end-user?

RQ 1.6: What are the disadvantages of recommended system on social media from an end user’s perspective?

2.3 Hypotheses

The hypotheses are divided into dependent and independent variables. With seven hypotheses as independent variable to understand the relationship between the social commerce and recommender system as independent variables with perceived usefulness, perceived ease of use, compatibility, trust, loyalty, variety of services, efficiency, intention and attitude. Each of these factors was then associated to the two dependent variables age and gender of the participant.

H1: There is a positive association between end-users mindset towards online shopping on social media and their convictions about its usefulness.

H2: There is a positive association between end-users mindset towards online shopping on social media and their convictions about its ease of use.

H3: Compatibility has a significant and positive relationship with consumer decisions to adopt social commerce

H4: Trust has a significant and positive relationship with consumer decisions to adopt social commerce

H5: Loyalty has a significant and positive relationship with consumer decisions to adopt social commerce

H6: Variety of services has a significant and positive relationship with consumer decisions to adopt social commerce

H7: Efficiency has a significant and positive relationship with consumer decisions to adopt social commerce.

H8: There is a positive association between end-users' intention to use online shopping on social media and their attitude towards social media.

3 Literature Review

3.1 Introduction

A literature review was conducted based on the articles available about the social commerce and recommender systems and the influencing factor for an end-user.
A literature review carried out in the following stages: gathering the collection of publications correlated to the subject of social commerce and recommender system concerning Facebook.

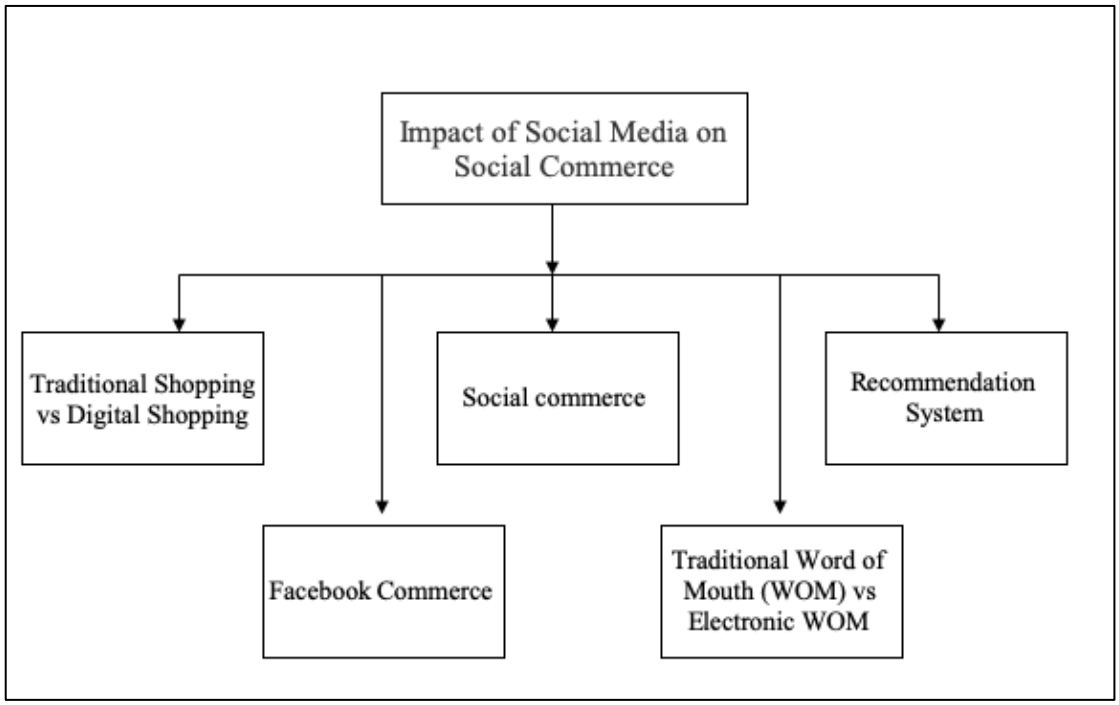

Figure 1: Literature Map

3.2 Traditional Shopping vs Digital Shopping

Qiu, Lin and Li (2015) believe the environment of recommender system comes from the e-commerce background and not from traditional business. The authors also contemplate that the contribution of social media is broadly incorporated by the e-commerce website (Qiu et al., 2015).
Feit, Wang, Bradlow and Fader (2015) argue that with a large quantity of information collected through different internet platforms, it occasionally is not evident on how the data will be used to make the best use of the existing information. Several approaches are used in order to observe customers usages, such as purchase activities, sentimental analysis, and psycho-social behaviour.

A fundamental novelty was used as a method named “Bayesian data fusion approach” in order for academics to examine traditional data and the digital data (Feit et al., 2015).
On the other hand, Le and Liaw (2017) experimented on the data collected from participants, and it was recognized that information search, recommender system, dynamic pricing, and end-user’s services did have a persuasive consequence on consumer’s reactions.
Whereas, Qiu and Lin (2015) find recommending the consumer purchase practice alluring and thought-provoking. Qiu and Lin (2015) believe the nature of recommender systems occurs from the e-commerce background and not from traditional business. The authors also speculate that an e-commerce website widely embraces the recommender system. The Qiu and Lin (2015) use the “Customer purchase prediction model (COREL)” to analyse and examine the recommender system and the preferences of the consumer (Qiu et al., 2015).
In this article, Lee, Xun and Chia-Chun (2019) studied online and offline sales. The transformation between information collection, while consumers browsers a product and information that is gathered while the consumers are offline were meticulously described. The authors think that online customers also depend on topographical deviations. Lee, Xun and Chia-Chun (2019) believe that the customers’ impact on social media also transpires due to a reliable source recommending or a review of the items. This, however, also transpires offline as word of mouth (WOM) practice, that took place before social media’s existence. Lee et al (2019) compare the idea of traditional vs digital WOM and additional practices in the report. Lee et al (2019) discuss the nature of the browsing history of a consumer.
On the other hand, Choi, Bell and Lodish (2015) recognize the source “Data source Relevance-based Hierarchical Parallel Distributed data mining Model (DRHPDM)” to improve the information that are received from the consumers. DRHPDM is used to enhance the information and gather the information that is appropriate to recommend the next unforeseeable purchase of the consumer (Choi et al., 2015).
In this paper, Fink (2015) accepts that the theory that was made about the electronic markets have been demonstrated right. However, the features disturbing the evaluation are collected and deliberated in this analysis by executing data analysis on the collected data. The paper reexamines the issued reports to examine on the tighter shift on the electronic market by conducting a conceptual analysis.

3.3 Social commerce

As social commerce is rising and making new sensations, the promoting scene is evolving. The convention of executing a business is changing with new plans of action for transmitting e-commerce as per the authors (Turban, Outland, King, Lee & Ting-Peng 2018).
In addition, Web 2.0 social media advances and framework, support and help the online business association to sell and purchase their items utilising social media. Turban et al (2018) believe customers think contrastingly in a quick-paced condition and are slanted to buy on the web. The structure authors discuss are distributed into six distinctive components. The authors believe that with reputation surfaces new prospects (J. V. Chen, Su, & Widjaja, 2016).
In this paper, the attributes of "social commerce (e-SQ)" is described. The diverse approaches to apprehend the attribute and usefulness of advertising are accomplished. The "VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR)" model is utilised to recognize the usefulness and e- SQ on Facebook (Y.-C. J. Wu, Shen, & Chang, 2015).
Huang and Benyoucef (2016) do a systematic review of the idea of social media and the highlights that are associated with it. The authors, however, follow set rules so as to accomplish the outcome by identifying the relationship between an e-commerce organistaion and a social media website. Huang and Benyoucef (2016) investigate the two unique stages that are Amazon and Facebook and understand that the number of end-users active on Facebook at the night are inclined to participate in online shopping. The idea of e-commerce embracing Web 2.0 and experiencing the progressions to become social commerce is the thing that lures the authors to direct this examination (Huang & Benyoucef, 2016).
A. Chong, Ngai, Ch'ng, Li and Lee (2015) believe that most countries have been having much success through social commerce due to the interactive medium between the customer and the organisation in the form of review and complaints. These reviews therein help attract other customers who then go on to benefit the e-commerce organisations. The push-pull-mooring model, which is a vagrant assumption to clarify the interchanging patterns of customers is applied to authors' study to understand the behaviour of social commerce (A. Chong et al., 2015).
The trust factor is achieved due to quality and the electronic WOM in social commerce, according to the authors (S. Abed, Dwivedi, & Williams, 2015). The support received from the friends and family is directly proportional to social commerce.

Ahmad and Zakaria (2018) reasons that trust is achieved when two entities have a past to accomplish social commerce. The trust transfer theory is applied to understand and analyse the influence of trust in social commerce. The result suggests that trust is a very significant part of the social commerce which influence the consumers to engage in social commerce.

3.4 Facebook Commerce

E-commerce websites, in modern ages, have permitted the consumers to log in with social media websites, by using social media credentials to log in to the e-commerce websites. In doing so, Bai, Dou, Zhao, Yang and Wen (2017) contemplate that any activity or view on the social media record of that specific consumer can be utilised to be a preference for the e-commerce website to anticipate any semblance of the consumer. Experiments conducted with the cross-site- purchase preference which also includes the shallow and deep textual features record, and the results of the experiment are favourable to apply the social content for recommending the purchase preferences (Bai, Dou, Zhao, Yang, & Wen, 2017).

Jeble, Kumari and Patil (2016) state that large information can be organized, semi-organized and unstructured constant data that is taken from various sources. A recommender framework adds to the procedure of tapping insight from the informational indexes. Numerous associations, for example, Google and Amazon, utilise this technique broadly and comprehend its advantage (Jeble et al., 2016).

Consequently, Goswami (2017) believes that, although the reviews and clickstream do have an impact on the positive sales revenue, the recommender system and relationships between the prices, product and marketplace make a considerable impact on the sales (Goswami, 2017).

However, Harris and Dennis (2017) at the point when led an investigation on the buyers buying items from the prescribed things on Facebook. The young and old buyers together are partial to react emphatically to these advertisements.

Kim and Ahn (2017) suggested that the customers each activity are observed so as to make an offline deal. The "likes" done by customers on Facebook is utilised against them to make a benefit in this online era. The organisations utilise a multi-channel to help end-users request. The online consumers' reviews show crucial criteria in accomplishing the business as per the authors (Kim & Ahn, 2017).

Xiang, Zheng, Lee and Zhao (2016) describe the impulse of customers to shop online and through social media. The basis of recommendation technique is also examined in social media to entice the customers (Xiang et al., 2016).

Additionally, a hidden state-characteristic hypothesis was led by the authors to comprehend the motivation of purchasing items on the web, on Facebook. This examination accepted that individuals purchasing and selling on the web are designated "C2C (Consumer-to-Consumer)" on Facebook. The investigation uncovers the legitimacy of the sponsors' and the reactions of the purchasers' (Y. Chen, Lu, Wang, & Pan, 2019).

Leong et al (2018) analysis the Facebook commerce (F- commerce) using partial least squares (PLS) to understand the brand loyalty to customers in social commerce. The results from the analysis show that brand loyalty does influence the customer to indulge in social commerce.

On the other hand, an analysis was conducted to find the urge and impulse of f- commerce using Stimulus-Organism-Response framework and it was discovered that Facebook users have 33% of an urge to partake in f-commerce whereas 61.7% Facebook users admit to impulsive shopping. This data was backed by the per day usage of an individual on Facebook and the marital status (A. Y. L. Chong, Lacka, Boying, & Chan, 2018).

Cui, Mou and Liu (2018) contributing to the study of f-commerce considers that browsing Facebook, and amount of usage initiates the impulse of f-commerce in end-users. The study also found that Facebook browsing history and product recommendation is directly associated with the urge to f-commerce (Cui et al., 2018).

Furthermore, a study was conducted using an Artificial Neural Network (ANN) and Q- sort procedure to analyse the behaviour of the end-user partaking in f-commerce. After a series of analysis, Hayashi, Wang, Kawai and Sumiya (2018) concludes that the end user’s knowledge is the main predictor in indulging in f-commerce. The study also revealed exciting aspects that influence in partaking the f-commerce such as Facebook usage, age, Facebook browsing, trust, loyalty (Hayashi et al., 2018).

3.5 Traditional Word of Mouth (WOM) vs Electronic WOM

Kim & Ahn (2017) use collaborating filtering (CF) algorithm in this research to study the recommender system of e-commerce. CF is the widely used algorithm to improve recommender system accuracy by incorporating social network analysis (SNA) and clustering techniques to gain optimum results. In this experiment, it was successful in proving

that the proposed model outcomes surpass the traditional comparison model, including conventional CF, using statistical significance (Kim & Ahn, 2017).

Consequently, K. Z. K. Zhang and Benyoucef (2016) conducted a study on different public moods and recommender system. Public mood data was extracted from the Chinese popular social media and e-business company namely, Sina MicroBlog and Taobao. With the help of models such as significance (F-statistics), R- square and recommender system accuracy (Means Absolute Percentage Error (MAPE)), it is concluded that revenue for the e-business company is all improved due to different public moods, be it happy, sad or remorseful.

Contributing to the study conducted by other researchers, the authors Shen, Li, Sun, Chen and Wang (2019) perceive that reviews for a product in social web play a colossal part in the income of the e-commerce association. This research investigates the relationship amongst sentiments, reviews and promotional approaches. Admittedly, it is believed that the predictive analytic approach such as sentimental analysis and neural network analysis facilitates future business research for predicting product sales in an online environment (Kaushik, Mishra, Rana, & Dwivedi, 2018).

Also, C.-Y. Li and Ku (2018) studied the impact of the reviews in textual as well as numerical format. The study states that the "electronic-Word of Mouth (eWOM)" has more influence on the market than the traditional WOM. This study was proved using the "joint-sentiment-topic model" from the extricated data (X. Li, Wu, & Mai, 2019). This study helps vendors to strategize logical operations by focusing on the relevant aspects.

With the assistance of powerful computer algorithms and sophisticated software-implementation big data analytics is far more amenable to EtT (empirical-then-theoretical) approach. The recommender system nature of these algorithms has mitigated the marketing barriers. From mobiles phones to laptops, the marketing products have become easy and accessible. The reviews and clickstreams have made the recommender system and revenue generation easy to the organistaions. The impact of BDA using approaches such as EtT where understanding the marketing trends, purchasing patterns and, promotional sales and "Til (Theoretical – in- Isolation)" where theoretically extracted big data information is systematically analysed are discussed (Lukosius & Hyman, 2019).

3.6 Recommender System

Furthermore, the study of BDA and Response Models in supply chain management (SCM) is extensively examined by Nguyen, Li, Spiegler, Ieromonachou and Lin (2018) by using

frameworks such as innovative categorisation, Review- up- to- date (recent reviews received by end-users) and content analysis. The study examines the use of BDA in SCM along with the level of analytics and recommender system of products. The study comprises elements based on parts of SCM in BDA, varieties of BDA applied in SCM and methods of BDA in SCM (Nguyen et al., 2018).

Hänninen, Mitronen and Kwan (2019) believe with a recommender system in place, the traditional retail is undergoing a significant transformation as platform-based multi-sided marketplaces, to point out Amazon, Alibaba, eBay, JD.com, and Rakuten are challenging the incumbent retailers. This e-commerce portal has increased in digital trading and the use of a social network to advertise ones' goods. Digital retailing has not only augmented the revenues but also helped in speedy shopping experience to more personalised products (Hänninen, Mitronen, & Kwan, 2019).

On the other hand, C. Zhang, Tian, Fan, Liu and Fan (2019), examine the product sales predicting with the help of macroeconomic pointers and online reviews. Although C. Zhang, Tian, Fan, Liu and Fan (2019), believe that macroeconomic indicators and online reviews are powerful tools to predict the online sales, but this was proved by using a combination of prospect theory as well as sentiment analysis.

A K-RecSys algorithm was created by the author to identify the uselessness of e-commerce as opposed to traditional shopping (Ko, 2018). This study also discusses the impact of a recommender systems works in bringing profits to the organisation than the traditional way of shopping. Shen et al (2019) analysis the online click data with the help of the algorithm and confirms that constant reminders, a recommendation of substitute items and complementary products plays a huge role in the success of social commerce (Shen et al., 2019).

Farivar, Turel and Yuan (2018) study investigated the impulse of buying a product online. This study speculates that according to practical and academic literature, it is proven that the impulse of buying products online increases due to the product recommender system. A signalling theory was used to examine the urge of social commerce due to product recommender system (Farivar et al., 2018).

Additionally, Friedrich (2016) establishes that with more options in the digital world recommender system brings trusted and effective way to narrow options. The author also determines that collaborating filtering and the end-users highly appreciate a personalised recommendation. This conclusion was made with the help of a number of experiments conducted with the dataset from an e-commerce organisation (Friedrich, 2016).

Yahia, Al-Neama and Kerbache (2018) run experiments on complaint data from the Fuman Kaitori Center and reviewer comments on e-commerce to get a personalised product recommended system. The experiment results in achieving the result with higher the review of a product; the more it is recommended to the consumer (Yahia et al., 2018).

3.7 Summary

Subsequently, online shopping was preferred to the traditional shopping. Online product reviews, e-WOM, platform-based multi-sided market places, clickstream database, promotional strategies, marketing in social media network are identified to cause to prefer online shopping. Thus, in conclusion, the factors such as age, gender, marital status, clickstreams, e-WOMs does influence the recommender system in the social media marketing or social commerce. Hence, the influence of recommender system in social commerce was summarised in the literature review using various models and experiments by different authors mentioned in this chapter.

4 Methodology

4.1 Introduction

A short illustration of the conceptual framework and the connecting sequences of each hypothesis to its dependent and independent variables are categorised. This research was conducted using Quantitative research methodology, where the relationship of the variables are examined to analyse the data using quantitative procedures (Creswel, 2009).

4.2 Research Design

Perceived Usefulness (PU) and Perceived Ease of Use (EOU) are viewed as two of the essential drivers to clarify client acknowledgement of the information framework (IS). PU is termed as the level of a client's conviction of improving his activity execution by utilising a specific IS, and EOU is characterized as the level of a client's confidence or ease while utilising an IS (Davis et al., 1989). TAM (Technology Acceptance Model) helps in building up a connection between the outside factors with PU and EOU, alongside IS of their effect on the social goal Behavioural Intentions (BI) of utilising the framework, which energises certainly of a framework.

TAM allows dependable devices with magnificent estimations (Salvatori & Marcantoni, 2015) and has been supported both logically and hypothetically. This venture uses TAM model and endeavours to comprehend the connections between the free factors, for example, compatibility, loyalty, trust, variety of services, and efficiency with the subordinate factors and how they connect to aim the attitude and real framework use behavioural intention (BI).

A TAM model illustrated is used to distinguish the connections and relate the below-mentioned hypotheses with the comparing dependent and independent variables

H1: There is a positive association between end-users mindset towards online shopping on social media and their convictions about its usefulness.

H2: There is a positive association between end-users mindset towards online shopping on social media and their convictions about its ease of use.

H3: Compatibility has a significant and positive relationship with consumer decisions to adopt social commerce.

H4: Trust has a significant and positive relationship with consumer decisions to adopt social commerce.

H5: Loyalty has a significant and positive relationship with consumer decisions to adopt social commerce.

H6: Variety of services has a significant and positive relationship with consumer decisions to adopt social commerce.
H7: Efficiency has a significant and positive relationship with consumer decisions to adopt social commerce.
H8: There is a positive association between end-users intention to use online shopping on social media and their attitude towards it.

4.3 Research Method

The purpose of this research is to compare the factors that influence a recommender system in social commerce. This research would examine the role of age, gender, Facebook usage, time on Facebook and online shopping to understand the various factors that result in a recommender system.
Due to the insufficiency of time and budget, an online survey was conducted to accumulate the required information.
Thus, a cross-sectional online survey was used for four weeks to acquire data to answer the research questions mention in section 2.2. A thorough description of the use of samples, data gathering, analysis technique will be presented in the following sections.

4.3.1 Sampling

Sampling aims to depreciate the cost as well as the workload that would likely take to survey the total target population. A sample is related to the collection of information from a group of people.
In this instance, a survey sampling outlines the means of collecting a sample of factors from the targeted population to organise a survey.

4.3.2 Target Population

The targeted population to conduct this research accumulated to 850,000 people over the age of 18 who access Facebook and participate in online shopping in New Zealand.

4.3.3 Sampling Method

Convenience sampling is a representation of a nonprobability sampling method, that was applied for conducting this research.

4.3.4 Sampling Unit

The sampling unit for this research is a person over 18 years of age, who has access to Facebook and participates in online shopping.

4.3.5 Sampling Size

The sample size was based on three factors. These prime factors ascertain the sample size based on the diversity of the population, the importance of acceptance error, and the confidence interval. The registered number of the total users of Facebook in New Zealand as of 2019, is 850,000 ("Facebook users in New Zealand - March 2019", 2019). Therefore, with the population size 850,000, a confidence interval of 4, and a confidence level of 95%, the sample size of 600 was established by adopting the sample size calculator accessible on https://www.surveysystem.com/. An image of the following sample size is displayed below in Figure 3.

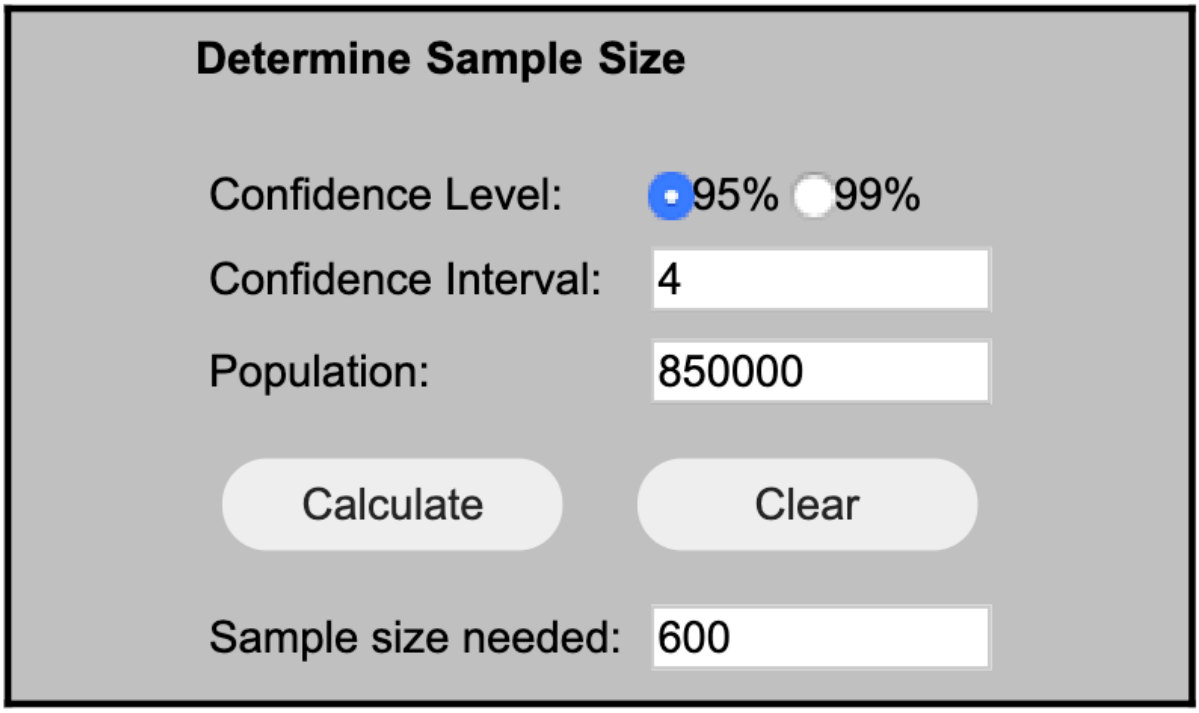

Figure 2: Sample size determination for survey (Source: Creative Research System, n.d.)

4.3.6 Data Gathering

The data for this research was gathered using an online survey. The Social Media website, Facebook was used as a portal to send the survey link to the participants for this online survey. This link was available for four weeks. This survey was conducted only after the approval of the ethics committee.

The participants were able to access this link during this time and answer the survey questions.

4.3.7 Reliability and Validity

The sample size to conduct a statistically significant analysis was 600 responses; however, received responses were only 203. Out of which one response was invalid, and thus, that counts up to 202 valid responses. Although all the participants answered all the survey questions, one participant in particular selected "No" to SQ1 which consented to the age of the participant to be above 18, that said the same participant also selected "60+" to SQ3 which address the age group of the participant. So, this response was ruled invalid because of the age conflict in this participant response.

Hence, the results were not statistically significant, and the analysis cannot be indiscriminate of other components. These results are subject to change, with a more significant number of participants.

4.3.8 Limitations

Mainly, this survey gathered information from a specific point of time and not in different periods, and this may be a cause of hindrance in identifying a particular trend for recommender system and its relationship with different variables.

Considering the survey was conducted online to accumulate the data, there may be a plausibility where the participants perhaps were dishonest or bias with their responses, which might lead to blemished results.

The participants might have neglected the questions and likely chose an option that may be unreliable.

4.4 Summary

A recommender system has become a necessity for e-commerce in this epoch. Today, understanding the factors that influence a recommender system from the end-users perceptive has become of utmost importance. This research outlines the objectives of undertaking this

research. This research analyses the factors which influence a recommender system in the e-commerce arena and identify the benefits offered and challenges that are faced.
This research used the defined hypotheses and redesigned the TAM model to answer the research questions listed in sections 2.3, 4.2 and 2.2, respectively. The research method adopted an online survey method to gather responses from the participants. The proposed sampling technique, data gathering, and data analysis methods were inspected in this research paper. The ethical considerations and limitations of this research are also listed in this chapter.

5 Analysis

5.1 Introduction

This section demonstrates the analysis executed on the answers collected from the online survey conducted for this research. This section starts with introducing the rating scales and formulating the list of codes assigned to the survey questions. This section also discusses the number of valid responses received while conducting the survey. Descriptive analysis was implemented on the data with the help of chi-square tests for univariate analysis.

5.2 Raw data

An online survey portal, Qualtrics (www.qualtics.com) was used to collect the responses from participants for four weeks. These responses that were collected from the participants was later on originated as raw data. This raw data was exported into a spreadsheet to convert it into a raw database.

5.3 Rating scales

A five-point Likert type, interval scale was used for eight of the questions in the survey. These survey questions were categorised with five valid responses, and the participants had to select one valid response according to the participants perspective. An example of the five-point survey is illustrated below.

Table 1: Five point likert type survey responses

Questions Statement	On average, how many times do you click on the marketing advertisements on Facebook?				
Responses	Always	Frequently	Sometimes	Rarely	Never

5.4 Number of responses to survey questions

The total number of responses received for the survey is 203, out of which 202 were valid responses. Although all the participants answered all the survey questions, one participant in particular selected “No” to SQ1 which consented to the age of the participant to be above 18, that said the same participant also selected “60+” to SQ3 which address the age group of the participant. So, this response was ruled invalid because of the age conflict in this participant response. As the total number of responses collected was less than 600 a statistical significance number, a descriptive analysis is conducted on the data received from the survey.

5.5 Descriptive analysis

The survey was divided into multiple aspects from age, gender, Facebook users and online shoppers to a preferred method of shopping to recommended systems. The survey was conducted to understand the correlation and relevance between age, gender, Facebook users, online shoppers, a preferred method of shopping and recommended systems.

5.5.1 Age Group (In years) Classification:

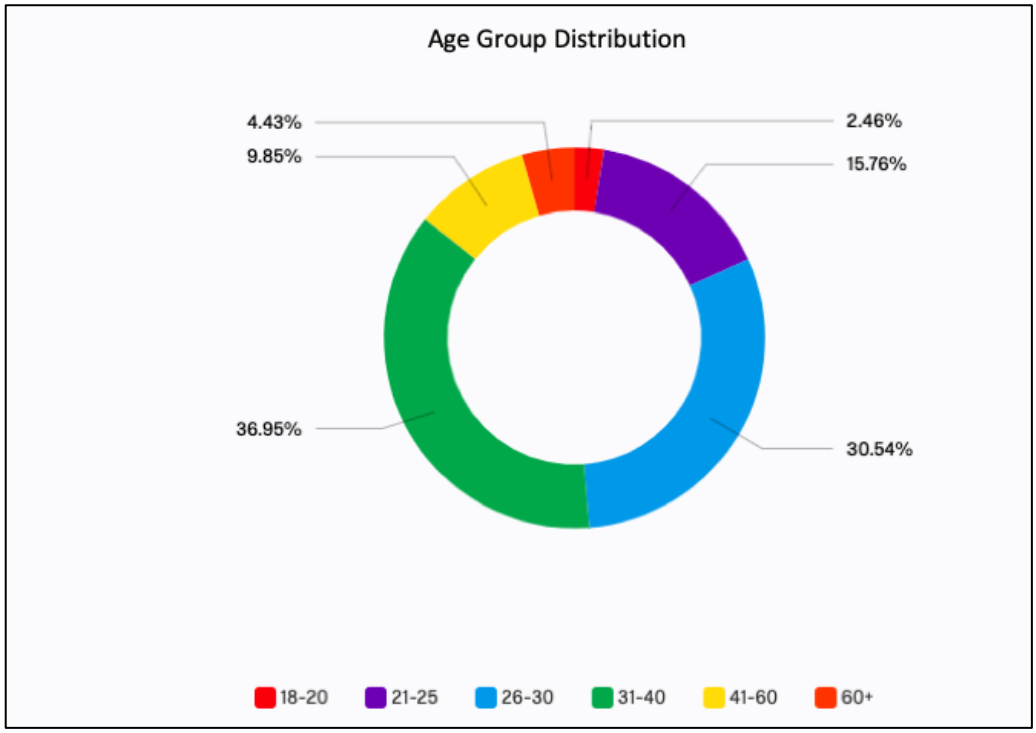

Figure 3: Age Group Distribution

In Figure 3 the participants of this survey are varied from 18 years of age to above 60 years of age. Although the participants with age group between 31- 40 years of age were the most surveyed people among the participants with 36.95% and participants with age group 26-30 were close behind by 30.54%, participants of all age group participated in this survey. The least participated participants were in the 18- 20 years category with only 2.46%.

5.5.2 Gender Distribution:

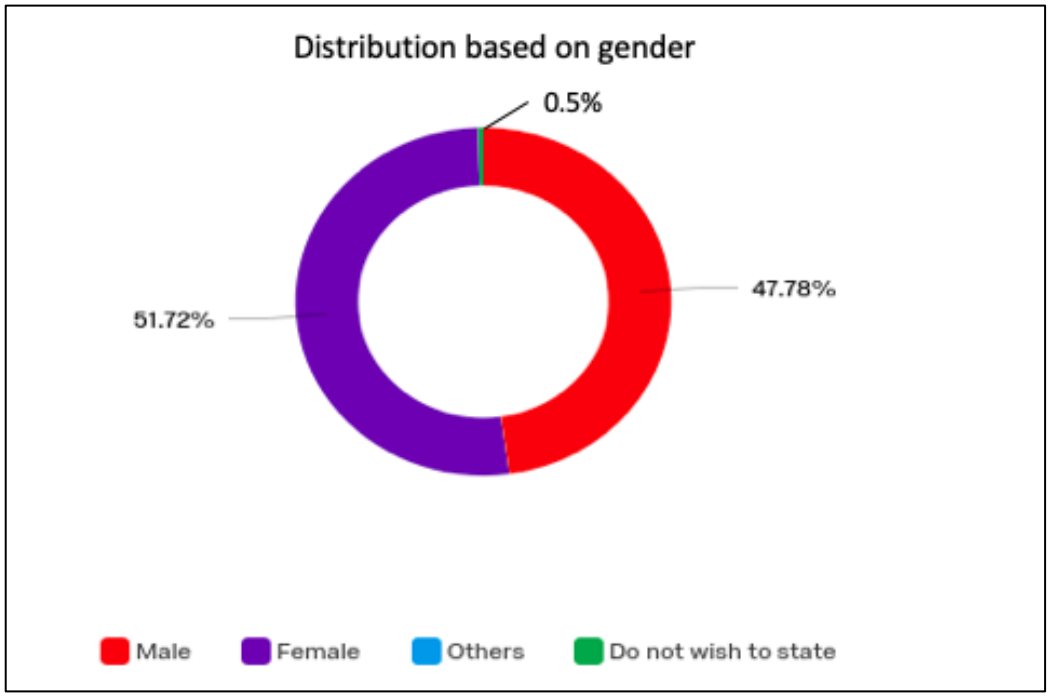

Figure 4: Distribution based on gender

Figure 4 represents out of the 202 responses 96 responses was from male participants with 47.78% and 105 responses from female participants with 51.72%. There were no participants who select ‘others’ as an answer, thus eliminating that category. However, there was 1 participant who did select ‘do not want to state’ option resulting in having a 0.5% of response.

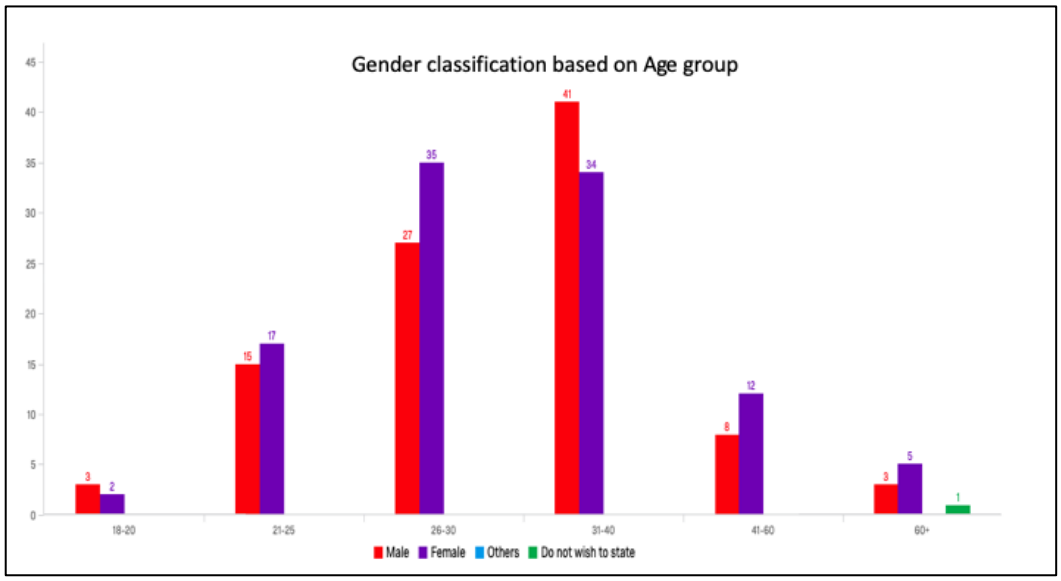

Figure 5 Gender classification based on age group

Figure 5 represents the classification of participants based on their gender and age group. From the graph, it is derived that each group has more female participants than male

participants expect 18-20 and 31-40 age groups were the male participants are more than the female participants who contributed to this research.

5.5.3 Distribution based on Facebook users:

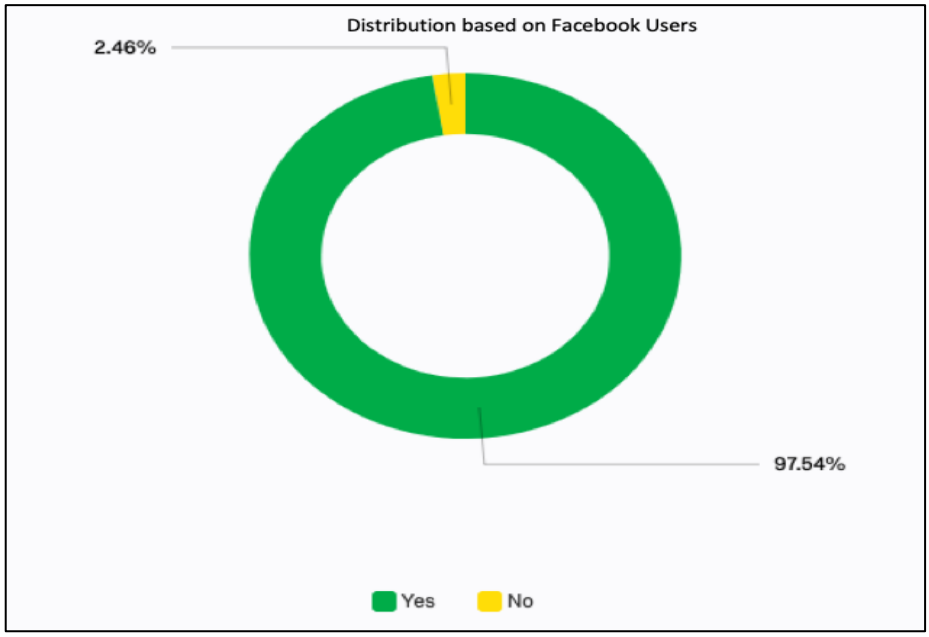

Figure 6: Distribution based on Facebook Users

Figure 6 describes, 197 people who participated in this survey out of 202 acknowledged to using Facebook regularly. In contrast, five people responded that although they use social media regularly, Facebook is not one of the applications they use. However, 97.54% of the population who participated in this survey use Facebook eliminating only 2.46% of the population.

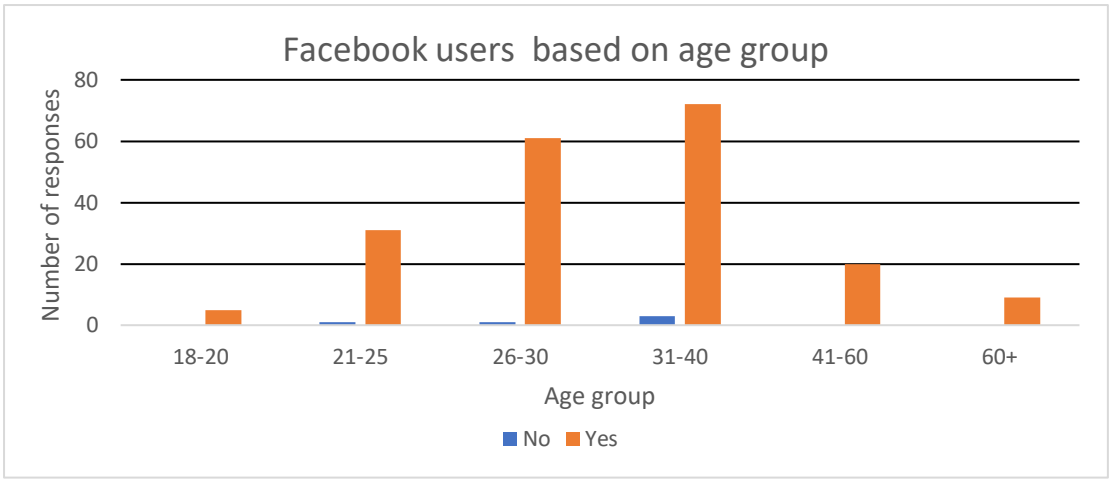

Figure 7 Facebook users based on age group

According to the bar chart in Figure 7, it is evident that Facebook is more popular among the age group between 26-30 and 31-40 with 61 and 72 responses, respectively. However, the ones who do not use Facebook also lie within the same age group, that being said all groups of age use Facebook from the observation of figure 8.

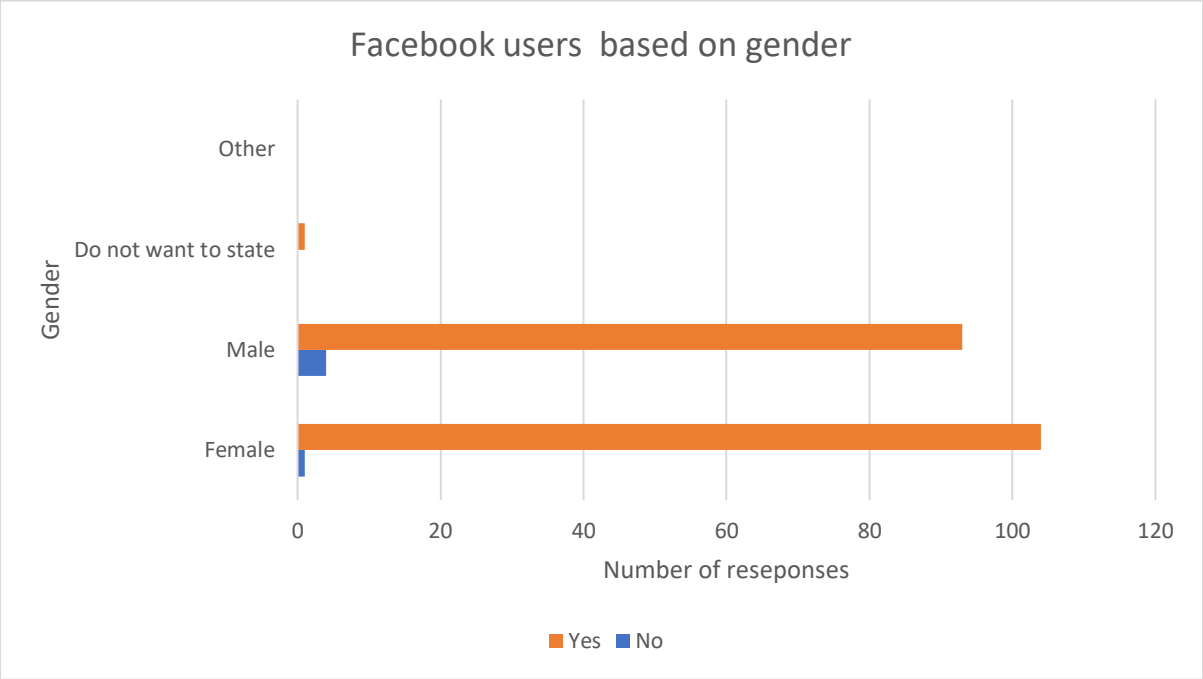

Figure 8 Facebook users based on gender

Figure 8 shows 104 users out of the 197 Facebook users are female with 104 responses, and 93 responses are acquired from the male. Moreover, 4 out of the 5 users not using Facebook are derived from male participants. Which states to prove that female use Facebook more as compared to the male participants.

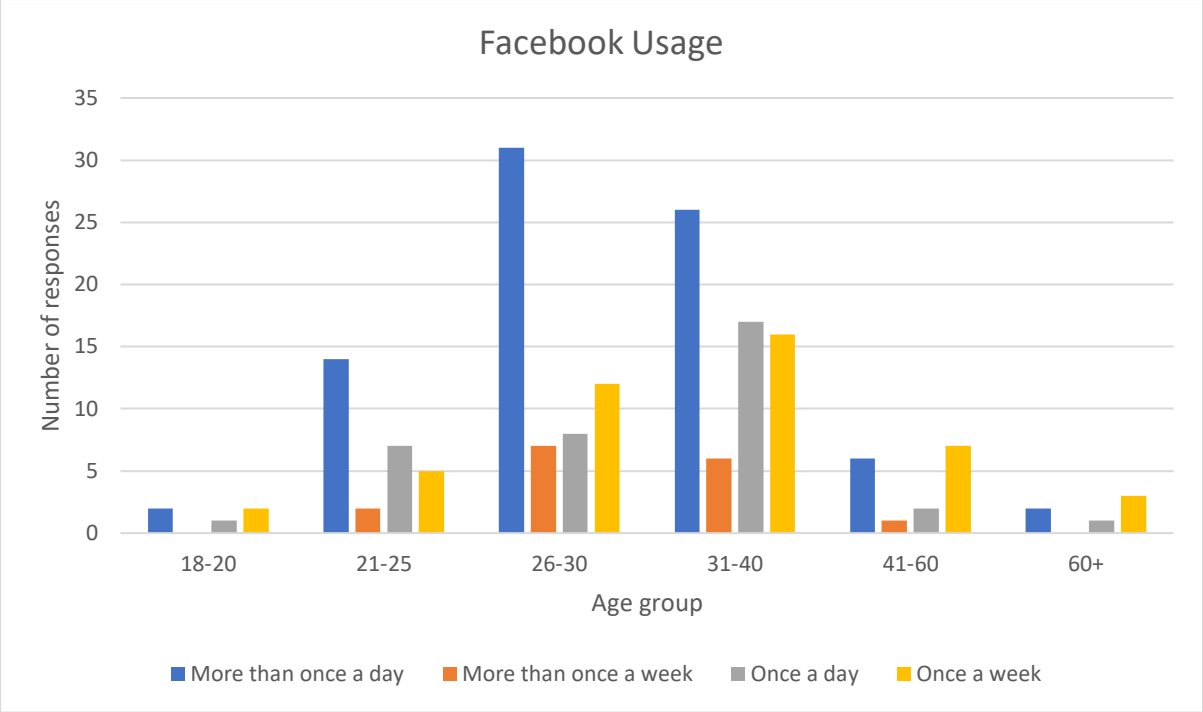

Figure 9 Frequent Facebook usage

Figure 9 represents that the participants between the age group 26-30 and 31-40 respectively use Facebook more than once a day as opposed to the participants in the other age group. From the Figure 10, it is also noticeable that participants from all age group use Facebook once a day, although it is more apparent between in age groups 21-25, 26-30 and 31-40 with 14, 31 and 26 participants respectively. The age group 18- 20 and above 60 are the participants who did not select 'more than once a week' as an option.

5.5.4 Distribution based on online shoppers:

27.23% of participants of this survey agreed to shop through online portals at least once a month, close behind is 17.33% of participants who shop at least once a week. However, it is one 3.47% of the participants who agreed to shop at least once a day.
That said, 19 participants from the age group 26-30 are the maximum people who shop at least once a month and 15 participants in the age group 31- 40 like shopping at least a month. At the same time, 16 participants from the age group 31- 40 select 'others' as an option stating that they shop once in a while and that is not constricted to how often the shop. From the data in figure 11, it is evident that the age group 31-40 lead in every option expect 'once a week', 'once a month' and 'more than once a week'.

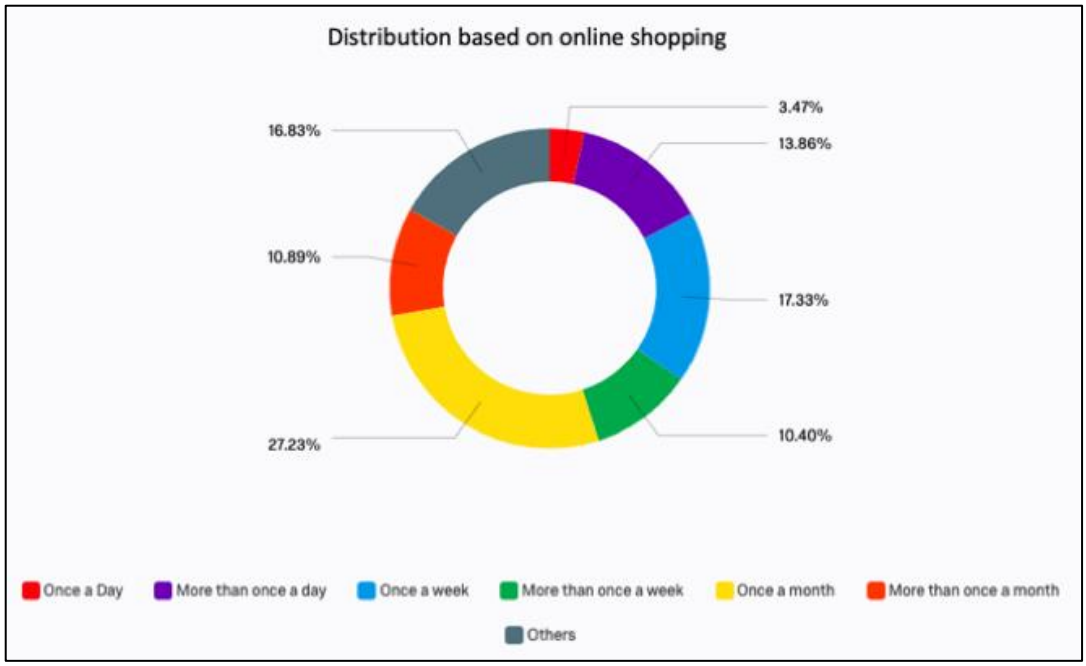

Figure 10 Online Shopping

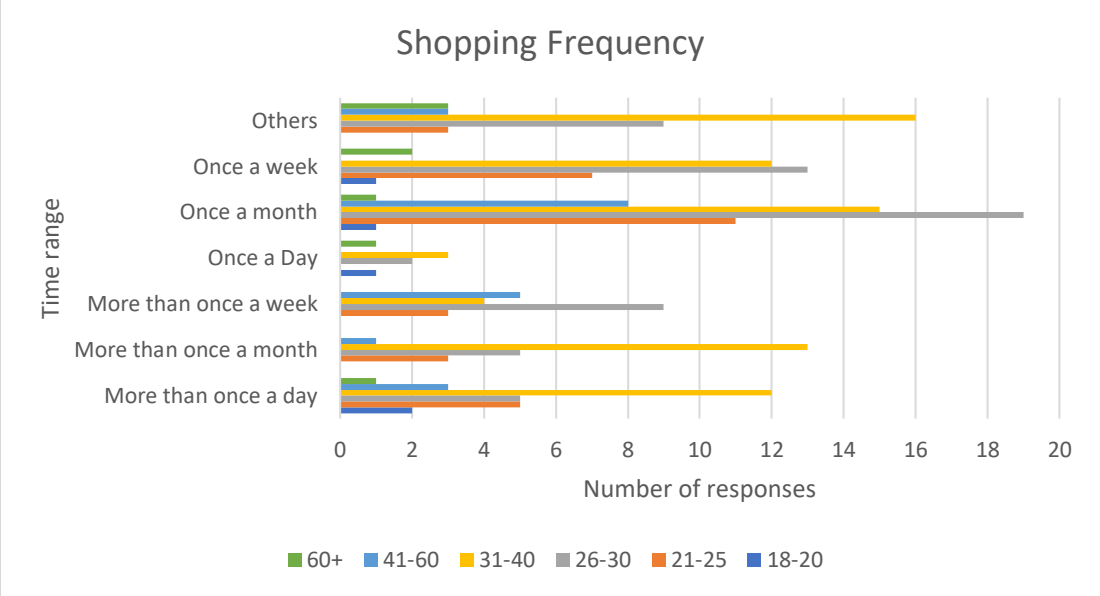

Figure 11 Shopping Frequency with respect to age

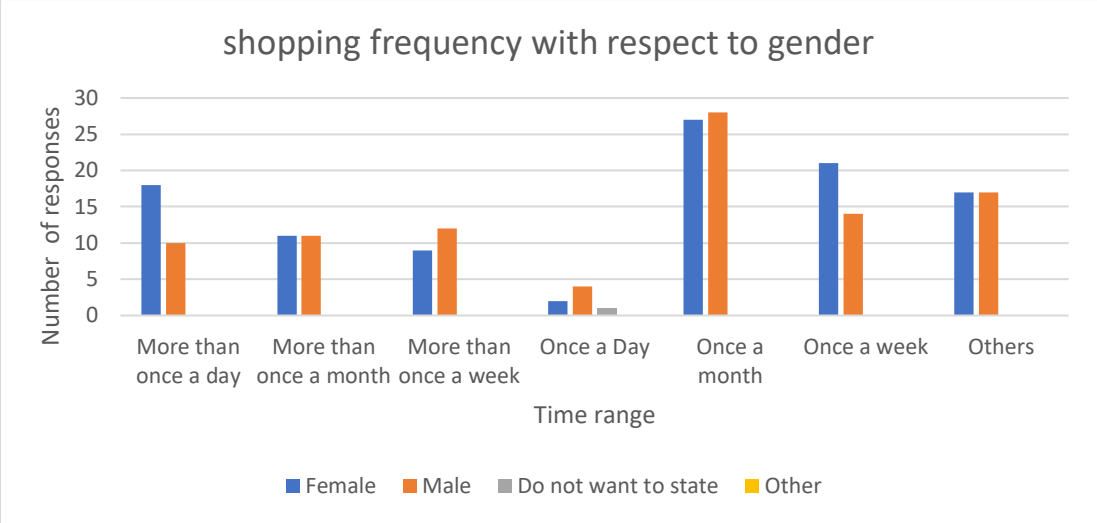

Figure 12 Shopping frequency with respect to gender

From the bar graphs above, it is evident that the age group 26-30 are more inclined to shop once a month as opposed to the other age groups regardless of the gender of the participant. However, females are more inclined to shop more than once a day or once a week with the age group of 31- 40 and 26-30, respectively. Whereas the rest of the age group Male are more prominent towards shopping online. That said, there were 17 male and female participants did not want to disclose the shopping frequency in the survey and thus selected the 'others' option. There was also an equal amount (11 responses) of male and female who shopped more than once a month.

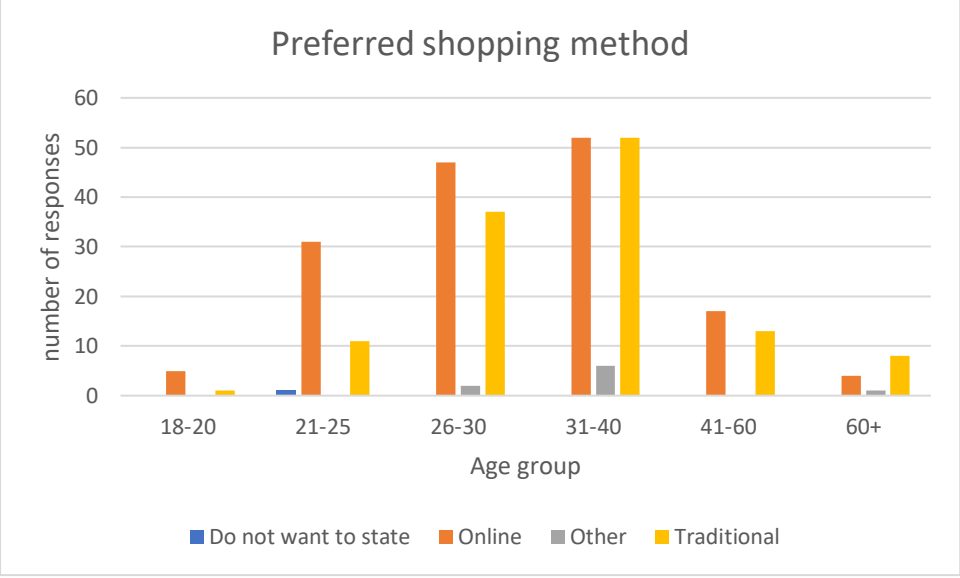

Figure 13 Preferred shopping method based on age group

An equal number of participants prefer online shopping as well the traditional form of shopping with 52 responses under the age group of 31-40. In contrast, under the age group of

18-20, 21-25, 26-30, 41-60 prefer online shopping as opposed to traditional shopping. However, the age group above 60 prefers the traditional shopping method. That said 1 participant out of the 202 participants under the age group of 21-25 refused to state their preference and thus selected the “Do not want to state” option.

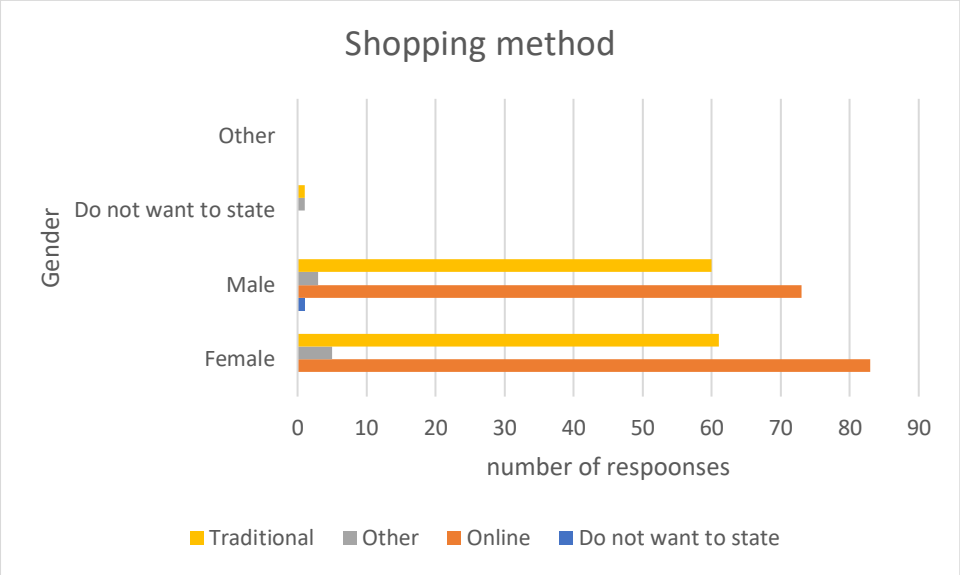

Figure 14 Preferred shopping method based on Gender

Precise observation from the graph above states the fact that both male and female prefer online shopping as opposed to traditional shopping. With 73 male participants and 83 female participants were preferring online shopping. Including, 60 and 61 from male and female respectively opting also for traditional shopping as an option. While 5 and 3 male and female participants respectively opted for ‘others’ as an option and did not state their preference.

5.5.5 Distribution based on recommender system

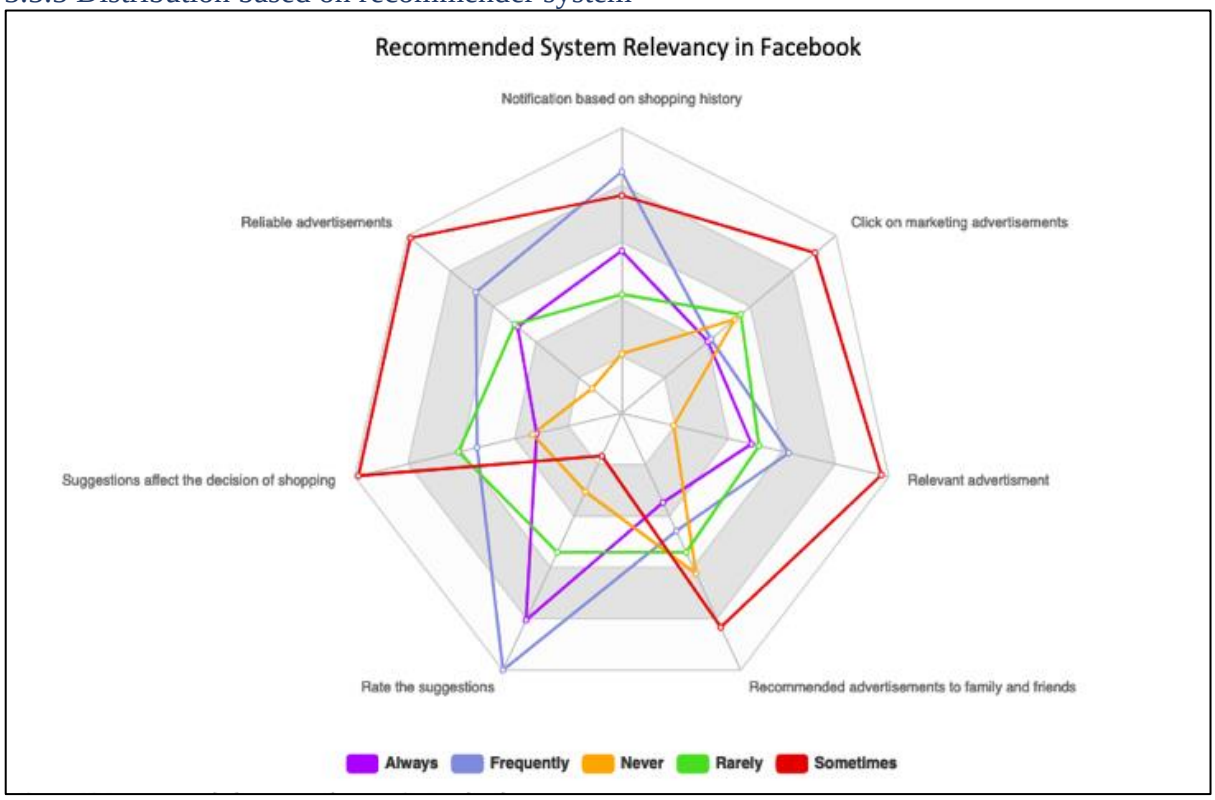

Figure 15 Recommended system relevancy in Facebook

Participants of this survey were asked questions based on recommended systems on Facebook. Questions varied between reliable advertisements, notification based on shopping history, relevant advertisement, whether suggestions affect a participants decision in shopping, whether the recommended advertisements were shared with family and friends and lastly to rate the suggestion received in Facebook.

According to the radar chart representation in figure 16, most of the participants chose "sometimes" as an answer except to rate the suggestions of the notifications where there is a significant dip in the result. Whereas the same category question was answered as "frequently" by most of the participants, along with "always". That said, option "Never" was select most of the times for the questions such as recommended advertisements were shared with family and friends and clicking on the marketing advertisement on Facebook. The radar chart also noticed that "rarely" was selected infrequently.

5.5.6 Distribution based on brand loyalty

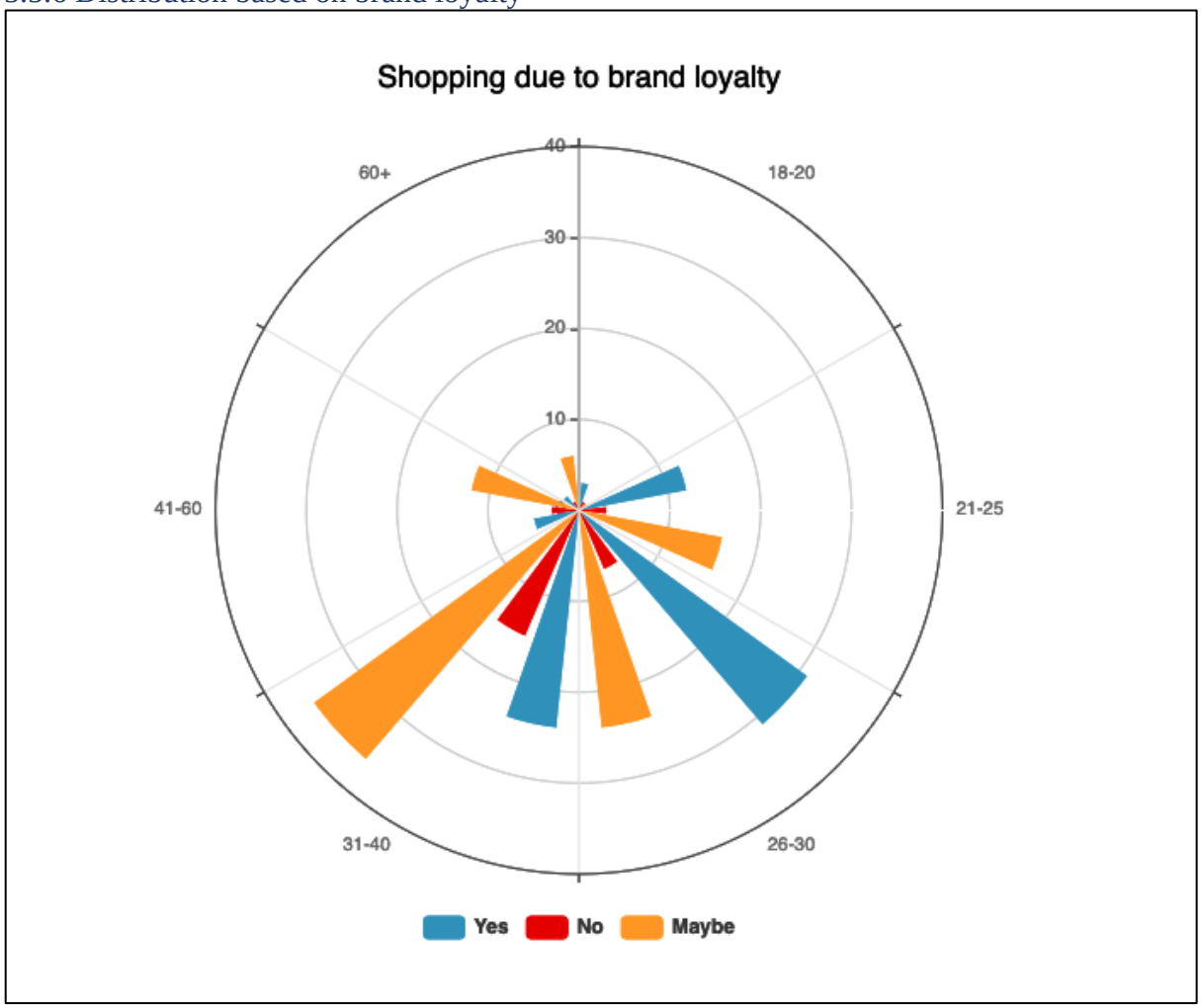

Figure 16: Distribution based on brand loyalty

According to the results from the survey, every age group selected "maybe" to the question if a brand was a prominent aspect while shopping online, expect the age group under 18-20 and 26-30. This graph represents that the increase in online shopping is not only due to brand loyalty since it was not disagreed, and it is safe to say that brand loyalty could be a possibility to shop online. That being said the age group under 18-20 and 26-30 selected "yes" thus confirming the popularity of online shopping in that age group is due to brand value.

5.6 Univariate analysis

The chi-square test and p-value were derived used Statistical Package for the Social Science (SPSS) an IBM statistical analysis tool, build 1.0.0.1275 64-bit edition for this research. SPSS is most popularly used by survey companies, marketing companies and other companies deriving the data management and data documentation. In order to use the SPSS, a trial version was download in the personal computer to run tests and analyse the data.

Chi-square test is a predominant criterion to run a hypothesis testing or statistical significance tests in which case the chi-square distribution when the null hypothesis is correct. Chi-square is used to understand the variance between the expected value and the observed value in one or more classes. In simple terms, chi-square tests are performed to verify the goodness of fit of the dataset or hypothesis. Chi-square can be easily calculated using a simple formula shown below:

$$\text{Chi-square Statistic} = \Sigma \frac{(Observed\ Frequency - Expected\ Frequency)^2}{Expected\ Frequency}$$

P-Value stands for probability value in the statistical hypothesis testing. P-value is used in the conditions of null hypothesis testing regarding quantifying the concept of statistical significance.

In order to understand the relevance between the survey questions and variables, the p-value was gathered from the chi-square analysis was carried out with a 95% confidence level. If the p-value was higher than 0.05, it was established to having no relationship between the corresponding variables, and thus the hypothesis was rejected.

The following is the hypothesis and the analysis carried out for the same.

5.6.1 Association between in the end user's mentality towards online shopping and their convictions its usefulness:

This section provides a detailed illustration of the end-users' mindset toward online shopping and their conviction in its usefulness. This analysis is performed using both age and gender as the factor to understand the end-users perceptive by identifying the relationship between the age and the perceived usefulness of shopping online. Likewise, gender and significance of the perceived usefulness of shopping online using social media

This analysis was executed using the cross-tabulation between each of the survey question in relation to the usefulness of shopping online with respect to both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the dependent variable age of the participants and the gender of the participants, along with the independent variables perceived usefulness of online shopping.

H1: There is a positive association between end-users mindset towards online shopping on Facebook and their convictions about its perceived usefulness.

Preferred Shopping method with respect to all age groups:

Table 2: Preferred Shopping method with respect to age

Select your preferred shopping method							
Response	Age Groups (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Do not want to state	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Online	100%	96.9%	75.8%	69.3%	85%	44.4%	76.8%
Other	0.0%	0.0%	3.2%	8.0%	0.0%	11.1%	4.4%
Traditional	20.0%	34.4%	59.7%	69.3%	65%	88.9%	60.1%

Preferred Shopping method with respect to gender:

Table 3: Preferred Shopping method with respect to gender

Select your preferred shopping method					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Do not want to state	0.0%	1.0%	0.0%	0.0%	0.5%
Online	79%	75.3%	0.0%	0.0%	76.8%
Other	4.8%	3.1%	100%	0.0%	4.4%
Traditional	58.1%	61.9%	100%	0.0%	60.1%

Table 2 and Table 3 classifies the cross-tabulation of age concerning the participant's preference in shopping method as well as the gender for the participant's preference in the shopping method. The participants most selected choice has been highlighted in the tables above.

Shopping Frequency with respect to all age groups:

Table 4: Shopping Frequency with respect to age

On an average, how often do you shop?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
More than once a day	40.0%	15.6%	8.1%	16.0%	15.0%	11.1%	13.8%
More than once a month	0.0%	9.4%	8.1%	17.3%	5.0%	0.0%	10.8%
More than once a week	0.0%	9.4%	14.5%	5.3%	25.0%	0.0%	10.3%
Once a Day	20.0%	0.0%	3.2%	4.0%	0.0%	11.1%	3.4%
Once a month	20.0%	34.4%	30.6%	20.0%	40.0%	11.1%	27.1%
Once a week	20.0%	21.9%	21.0%	16.0%	0.0%	22.2%	17.2%
Others	0.0%	9.4%	14.5%	21.3%	15.0%	33.3%	16.7%

Shopping Frequency with respect to gender:

Table 5: Shopping Frequency with respect to gender

On an average, how often do you shop?					
Response	Gender				Total
	Female	Male	Do not want to state	Others	
More than once a day	17.1%	10.3%	0.0%	0.0%	13.8%
More than once a month	10.5%	11.3%	0.0%	0.0%	10.8%
More than once a week	8.6%	12.4%	0.0%	0.0%	10.3%
Once a Day	1.9%	4.1%	100.0%	0.0%	3.4%
Once a month	25.7%	28.9%	0.0%	0.0%	27.1%
Once a week	20.0%	14.4%	0.0%	0.0%	17.2%
Others	16.2%	17.5%	0.0%	0.0%	16.7%

Table 4 and Table 5 assigns the cross-tabulation of age concerning participants shopping frequency as well as the gender for the participants shopping frequency. The participants most selected choice has been highlighted in the tables 4 and 5.

Chi-square tests were executed to the tables mentioned above to analyse the significance of participants age and gender on the perceived uselessness of online shopping, and their related chi-square values and p-values are documented in the table 6.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on perceived usefulness based on social commerce and recommended systems:

Table 6: Overview with the chi-square test and p-value

Table Number	Hypothesis 1	Table Description	Chi-square value	P-value
Table 2	*There is a positive association between end-users mindset towards online shopping on Facebook and their convictions about its perceived usefulness.*	Preferred Shopping method with respect to age	7.612	0.022
Table 4		Shopping Frequency with respect to age	39.405	0.051
Table 3		Preferred Shopping method with respect to gender	2.175	0.337
Table 5		Shopping Frequency with respect to gender	4.405	0.372

From the above Table 6, it is apparent that the chi-square tests performed on some of the variables recognize the connection between participants and survey questions about the perceived usefulness of social commerce, the p-value is lesser than or equal to 0.05.

As p 0.05, *H1* cannot be dismissed as there is an association between the participants and the perceived usefulness of social commerce.

5.6.2 Association between in the end user's mentality towards online shopping and their convictions its ease of use:

This section provides a detailed illustration of the end-users' mindset toward online shopping and their conviction in its ease of use. This analysis is performed using both age and gender as the factor to understand the end-users perceptive by identifying the relationship between the age and ease of use of shopping online. Likewise, gender and significance of ease of use of shopping online using social media

This analysis was executed using the cross-tabulation between each of the survey question in relation with the ease of use of shopping online with respect to both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, the gender of the participants, dependent variables and the ease of use of online shopping.

H2: There is a positive association between end-users' mindset towards online shopping on social media and their convictions about its ease of use.

Notification from Facebook to shop based on Previous shopping history with respect to age all groups:

Table 7: Notification from Facebook to shop based on Previous shopping history with respect to age

On average, how many times do you get notifications from Facebook to shop based on previous shopping history?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	12.5%	22.6%	18.7%	35.0%	0.0%	20.2%
Frequently	60.0%	50.0%	25.8%	25.3%	25.0%	22.2%	30.0%
Sometimes	0.0%	28.1%	27.4%	30.7%	25.0%	11.1	27.1%
Rarely	0.0%	3.1%	14.5%	18.7%	15.0%	33.3%	14.8%
Never	0.0%	6.3%	9.7%	5.3%	0.0%	33.3%	7.4%

On average, how many times do you get notifications from Facebook to shop based on previous shopping history?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	12.5%	22.6%	18.7%	35.0%	0.0%	20.2%
Frequently	60.0%	50.0%	25.8%	25.3%	25.0%	22.2%	30.0%
Sometimes	0.0%	28.1%	27.4%	30.7%	25.0%	11.1	27.1%
Rarely	0.0%	3.1%	14.5%	18.7%	15.0%	33.3%	14.8%
Never	0.0%	6.3%	9.7%	5.3%	0.0%	33.3%	7.4%

Notification from Facebook to shop based on Previous shopping history with respect to gender:

Table 8: Notification from Facebook to shop based on Previous shopping history with respect to gender

On average, how many times do you get notifications from Facebook to shop based on previous shopping history?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	24.8%	15.5%	0.0%	0.0%	20.2%
Frequently	29.5%	30.9%	0.0%	0.0%	30.0%
Sometimes	26.7%	27.8%	0.0%	0.0%	27.1%
Rarely	13.3%	16.5%	0.0%	0.0%	14.8%
Never	5.7%	8.2%	100.0%	0.0%	7.4%

Table 7 and Table 8 classifies the cross-tabulation of age regarding the participants previous shopping history in Facebook used in online shopping using social media as well as the gender for the participants previous shopping history used in online shopping using social media. The participants most selected choice has been highlighted in the tables 7 and 8.

Suggestions made in Facebook affect your decision of shopping online on social media with respect to all age groups:

Table 9: Suggestions made in Facebook affect your decision of shopping online on social media with respect to age

Do the suggestions made in Facebook affect your decision of shopping?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	12.5%	11.3%	9.3%	10.0%	11.1%	11.3%
Frequently	0.0%	28.1%	21.0%	14.7%	25.0%	11.1%	19.2%
Sometimes	60.0%	34.4%	33.9%	38.7%	30.0%	11.1%	35.0%
Rarely	0.0%	15.6%	19.4%	24.0%	20.0%	55.6%	21.7%
Never	0.0%	6.3%	14.5%	12.0%	15.0%	11.1%	11.8%

Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender:

Table 10: Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender

Do the suggestions made in Facebook affect your decision of shopping?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	15.2%	7.2%	0.0%	0.0%	11.3%
Frequently	21.0%	17.5%	0.0%	0.0%	19.2%
Sometimes	32.4%	38.1%	100.0%	0.0%	35.0%
Rarely	18.1%	25.8%	0.0%	0.0%	21.7%
Never	11.4%	11.3%	0.0%	0.0%	11.8%

Table 9 and Table 10 assigns the cross-tabulation of age concerning the suggestions made in Facebook influencing the participant's decision of online shopping in social media as well as the gender concerning the suggestions made in Facebook influencing the participant's decision of online shopping in social media. The participants most selected choice has been highlighted in the tables 9 and 10.

Chi-square tests were executed to the tables mentioned above to analyse and speculate the significance of participants age and gender on the ease of use on online shopping in social media, and their related chi-square values and p-values are documented in the table 11.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on perceived ease of use based on social commerce and recommended systems:

Table 11: Overview with the chi-square test and p-value

Table Number	Hypothesis 2	Table Description	Chi-square value	P-value
Table 7	*There is a positive association between end-users' mindset towards online shopping on social media and their convictions about its ease of use.*	Notification from Facebook to shop based on Previous shopping history with respect to age	28.716	0.077
Table 9		Suggestions made in Facebook affect your decision of shopping online on social media with respect to age	21.133	0.063
Table 8		Notification from Facebook to shop based on Previous shopping history with respect to gender	3.008	0.130
Table 10		Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender	4.976	0.097

From the above table 11 it is apparent that the chi-square tests performed on all of the variables does not recognize the connection between participants and survey questions in relation to perceived ease of use of social commerce, the p-value is greater than 0.05.

As $p > 0.05$, *H2* can be dismissed as there is a no association between the participants and the perceived ease of use of social commerce.

5.6.3 Significance of Compatibility in Social commerce:

This section provides detailed illustration about the relationship between compatibility and end users' decision to adapt social commerce. This analysis is performed using the both age and gender as the factor to understand the end users perceptive by identifying the relationship between the age and significance of compatibility of shopping online using social media. Likewise, gender and significance of compatibility of shopping online using social media This analysis was executed using the cross-tabulation between each of the survey question in relation with the compatibility of social commerce with respect to both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, gender of the participants, dependent variables and the compatibility of social commerce.

H3: Compatibility has a significant and positive relationship with consumer decisions to adopt social commerce.

Rate social commerce marketing suggestion made to you by Facebook with respect to all age groups:

Table 12: Rate social commerce marketing suggestion made to you by Facebook with respect to age

How would you rate the marketing suggestions made for you on Facebook?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Brilliant	60.0%	18.8%	14.5%	16.0%	45.0%	0.0%	19.2%
Above Average	40.0%	46.9%	33.9%	22.7%	5.0%	22.2%	28.6%
Average	0.0%	25.0%	32.3%	41.3%	35.0%	66.7%	35.5%
Below Average	0.0%	6.3%	14.5%	12.0%	10.0%	0.0%	10.8%
Poor	0.0%	3.1%	4.8%	8.0%	5.0%	11.1%	5.9%

Rate social commerce marketing suggestion made to you by Facebook with respect to gender:

Table 13: Rate social commerce marketing suggestion made to you by Facebook with respect to gender

How would you rate the marketing suggestions made for you on Facebook?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Brilliant	20.0%	18.6%	0.0%	0.0%	19.2%
Above Average	32.4%	24.7%	0.0%	0.0%	28.6%
Average	33.3%	38.1%	0.0%	0.0%	35.5%
Below Average	9.5%	12.4%	0.0%	0.0%	10.8%
Poor	0.0%	4.8%	6.2%	100.0%	5.9%

Table 12 and Table 13 classifies the cross-tabulation of age concerning the participants rating social commerce marketing suggestion made by Facebook as well as the gender for the participants rating social commerce marketing suggestion made by Facebook. The participants most selected choice has been highlighted in the tables 12 and 13.

Social Commerce based of Brand Loyalty with respect to all age groups:

Table 14: Social Commerce based of Brand Loyalty with respect to age

Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Maybe	20.0%	50.0%	38.7%	48.0%	60.0%	66.7%	46.8%
No	20.0%	9.4%	11.3%	20.0%	15.0%	11.1%	14.8%
Yes	60.0%	37.5%	50.0%	32.0%	25.0%	22.2%	37.9%

Social Commerce based of Brand Loyalty with respect to gender:

Table 15: Social Commerce based of Brand Loyalty with respect to gender

Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Maybe	46.7%	46.4%	100.0%	0.0%	46.8%
No	12.4%	17.5%	0.0%	0.0%	14.8%
Yes	40.0%	36.1%	0.0%	0.0%	37.9%

Table 14 and Table 15 assigns the cross-tabulation of age concerning social commerce based on brand loyalty as well as the gender for social commerce based on brand loyalty. The participants most selected choice has been highlighted in the tables 14 and 15.

Clickstreams on the marketing suggestions based on social commerce with respect to all age groups:

Table 16: Clickstreams on the marketing suggestions based on social commerce with respect to age

On average, how many times do you click on the marketing advertisements on Facebook?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	9.4%	16.1%	13.3%	15.0%	11.1%	14.3%
Frequently	20.0%	21.9%	8.1%	16.0%	15.0%	22.2%	14.8%
Sometimes	40.0%	40.6%	37.1%	25.3%	40.0%	0.0%	32.0%
Rarely	0.0%	21.9%	17.7%	21.3%	20.0%	22.2%	19.7%
Never	0.0%	6.3%	21.0%	22.7%	10.0%	44.4%	18.7%

Clickstreams on the marketing suggestions based on social commerce with respect to gender:

Table 17: Clickstreams on the marketing suggestions based on social commerce with respect to gender

On average, how many times do you click on the marketing advertisements on Facebook?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	16.2%	11.3%	100.0%	0.0%	14.3%
Frequently	14.3%	15.5%	0.0%	0.0%	14.8%
Sometimes	32.4%	32.0%	0.0%	0.0%	32.0%
Rarely	17.1%	22.7%	0.0%	0.0%	19.7%
Never	20.0%	17.5%	0.0%	0.0%	18.7%

Table 16 and Table 17 categorises the cross-tabulation of age concerning clickstreams on the marketing suggestions based on social commerce as well as the gender for clickstreams on the marketing suggestions based on social commerce. The participants most selected choice has been highlighted in the tables 16 and 17.

Recommend the suggested advertisements on Facebook to your family and friends with respect to all age groups:

Table 18: Recommend the suggested advertisements on Facebook to your family and friends with respect to age

Do you recommend the suggested advertisements on Facebook to your family and friends?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	15.6%	9.7%	12.0%	10.0%	11.1%	12.3%
Frequently	20.0%	12.5%	21.0%	14.7%	10.0%	22.2%	16.3%
Sometimes	20.0%	40.6%	33.9%	21.3%	40.0%	11.1%	29.6%
Rarely	20.0%	25.0%	12.9%	21.3%	20.0%	22.2%	19.2%
Never	0.0%	6.3%	22.6%	29.3%	20.0%	33.3%	22.2%

Recommend the suggested advertisements on Facebook to your family and friends with respect to gender:

Table 19: Recommend the suggested advertisements on Facebook to your family and friends with respect to gender

Do you recommend the suggested advertisements on Facebook to your family and friends?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	14.3%	9.3%	100.0%	0.0%	12.3%
Frequently	21.9%	10.3%	0.0%	0.0%	16.3%
Sometimes	27.6%	32.0%	0.0%	0.0%	29.6%
Rarely	18.1%	20.6%	0.0%	0.0%	19.2%
Never	18.1%	26.8%	0.0%	0.0%	22.2%

Table 18 and Table 19 states the cross-tabulation of age for recommending the suggested advertisements on Facebook to your family and friends as well as the gender for recommending the suggested advertisements on Facebook to your family and friends. The participants most selected choice has been highlighted in the tables 18 and 19.
Chi-square tests were executed to the tables mentioned above to analyse and speculate the significance of participants age and gender on the compatibility on online shopping in social media, and their related chi-square values and p-values are documented in the table 20.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on the compatibility of social commerce and recommended system:

Table 20: Overview with the chi-square test and p-value

Table Number	Hypothesis 3	Table Description	Chi-square value	P-value
Table 12	*Compatibility has a significant and positive relationship with consumer decisions to adopt social commerce.*	Rate social commerce marketing suggestion made to you by Facebook with respect to age	35.248	0.102
Table 14		Social Commerce based of Brand Loyalty with respect to age	10.413	0.053
Table 16		Clickstreams on the marketing suggestions based on social commerce with respect to age	23.937	0.054
Table 18		Recommend the suggested advertisements on Facebook to your family and friends with respect to age	23.394	0.006
Table 13		Rate social commerce marketing suggestion made to you by Facebook with respect to gender	1.969	0.291
Table 15		Social Commerce based of Brand Loyalty with respect to gender	1.097	0.784
Table 17		Clickstreams on the marketing suggestions based on social commerce with respect to gender	1.846	0.609
Table 19		Recommend the suggested advertisements on Facebook to your family and friends with respect to gender	2.175	0.337

From the above Table 20, it is apparent that the chi-square tests performed on few of the variables do recognize the connection between participants and survey questions about the compatibility of social commerce, the p-value is lesser than or equal to 0.05.

As p 0.05, *H3* cannot be dismissed as there is an association between the participants and the compatibility of social commerce.

5.6.4 Significance of Trust in Social commerce:

This section provides a detailed illustration of the relationship between trust and end-users' decision to adopt social commerce. This analysis is performed using both age and gender as the factor to understand the end-users perceptive by identifying the relationship between the age and significance of trust of shopping online using social media. Likewise, gender and significance of trust of shopping online using social media

This analysis was executed using the cross-tabulation between each of the survey questions in relation with the trust of social commerce with respect to both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, the gender of the participants, dependent variables and the trust of end-users' in terms of social commerce.

H4: Trust has a significant and positive relationship with consumer decisions to adopt social commerce.

Suggestions made in Facebook affect your decision of shopping online on social media with respect to all age groups:

Table 21: Suggestions made in Facebook affect your decision of shopping online on social media with respect to age

Do the suggestions made in Facebook affect your decision of shopping?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	12.5%	11.3%	9.3%	10.0%	11.1%	11.3%
Frequently	0.0%	28.1%	21.0%	14.7%	25.0%	11.1%	19.2%
Sometimes	60.0%	34.4%	33.9%	38.7%	30.0%	11.1%	35.0%
Rarely	0.0%	15.6%	19.4%	24.0%	20.0%	55.6%	21.7%
Never	0.0%	6.3%	14.5%	12.0%	15.0%	11.1%	11.8%

Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender:

Table 22: Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender

Do the suggestions made in Facebook affect your decision of shopping?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	15.2%	7.2%	0.0%	0.0%	11.3%
Frequently	21.0%	17.5%	0.0%	0.0%	19.2%
Sometimes	32.4%	38.1%	0.0%	0.0%	35.0%
Rarely	18.1%	25.8%	0.0%	0.0%	21.7%
Never	11.4%	11.3%	100.0%	0.0%	11.8%

Table 21 and Table 22 classifies the cross-tabulation of age concerning the participant's decision on shopping online as well as the gender for the participant's decision on shopping online. The participants most selected choice has been highlighted in the tables 21 and 22.

Rate social commerce marketing suggestion made to you by Facebook with respect to all age groups:

Table 23: Rate social commerce marketing suggestion made to you by Facebook with respect to age

How would you rate the marketing suggestions made for you on Facebook?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Brilliant	60.0%	18.8%	14.5%	16.0%	45.0%	0.0%	19.2%
Above Average	40.0%	46.9%	33.9%	22.7%	5.0%	22.2%	28.6%
Average	0.0%	25.0%	32.3%	41.3%	35.0%	66.7%	35.5%
Below Average	0.0%	6.3%	14.5%	12.0%	10.0%	0.0%	10.8%
Poor	0.0%	3.1%	4.8%	8.0%	5.0%	11.1%	5.9%

Rate social commerce marketing suggestion made to you by Facebook with respect to gender:

Table 24: Rate social commerce marketing suggestion made to you by Facebook with respect to gender

How would you rate the marketing suggestions made for you on Facebook?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Brilliant	20.0%	18.6%	0.0%	0.0%	19.2%
Above Average	32.4%	24.7%	0.0%	0.0%	28.6%
Average	33.3%	38.1%	0.0%	0.0%	35.5%
Below Average	9.5%	12.4%	0.0%	0.0%	10.8%
Poor	0.0%	4.8%	6.2%	100.0%	5.9%

Table 23 and Table 24 assigns the cross-tabulation of age concerning rating social commerce marketing suggestion made by Facebook as well as the gender for rating social commerce marketing suggestion made by Facebook. The participants most selected choice has been highlighted in the tables 23 and 24.

Social Commerce based of Brand Loyalty with respect to all age groups:

Table 25: Social Commerce based of Brand Loyalty with respect to age

Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Maybe	20.0%	50.0%	38.7%	48.0%	60.0%	66.7%	46.8%
No	20.0%	9.4%	11.3%	20.0%	15.0%	11.1%	14.8%
Yes	60.0%	37.5%	50.0%	32.0%	25.0%	22.2%	37.9%

Social Commerce based of Brand Loyalty with respect to gender:

Table 26: Social Commerce based of Brand Loyalty with respect to gender

Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Maybe	46.7%	46.4%	100.0%	0.0%	46.8%
No	12.4%	17.5%	0.0%	0.0%	14.8%
Yes	40.0%	36.1%	0.0%	0.0%	37.9%

Table 25 and Table 26 classes the cross-tabulation of age concerning social commerce based on brand loyalty as well as the gender for social commerce based on brand loyalty. The participants most selected choice has been highlighted in the tables 25 and 26.

Shopping Frequency with respect to all age groups:

Table 27: Shopping Frequency with respect to age

On an average, how often do you shop?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
More than once a day	40.0%	15.6%	8.1%	16.0%	15.0%	11.1%	13.8%
More than once a month	0.0%	9.4%	8.1%	17.3%	5.0%	0.0%	10.8%
More than once a week	0.0%	9.4%	14.5%	5.3%	25.0%	0.0%	10.3%
Once a Day	20.0%	0.0%	3.2%	4.0%	0.0%	11.1%	3.4%
Once a month	20.0%	34.4%	30.6%	20.0%	40.0%	11.1%	27.1%
Once a week	20.0%	21.9%	21.0%	16.0%	0.0%	22.2%	17.2%
Others	0.0%	9.4%	14.5%	21.3%	15.0%	33.3%	16.7%

Shopping Frequency with respect to gender:

Table 28: Shopping Frequency with respect to gender

On an average, how often do you shop?					
Response	Gender				Total
	Female	Male	Do not want to state	Others	
More than once a day	17.1%	10.3%	0.0%	0.0%	13.8%
More than once a month	10.5%	11.3%	0.0%	0.0%	10.8%
More than once a week	8.6%	12.4%	0.0%	0.0%	10.3%
Once a Day	1.9%	4.1%	100.0%	0.0%	3.4%
Once a month	25.7%	28.9%	0.0%	0.0%	27.1%
Once a week	20.0%	14.4%	0.0%	0.0%	17.2%
Others	16.2%	17.5%	0.0%	0.0%	16.7%

Table 27 and Table 28 categorises the cross-tabulation of age concerning participants shopping frequency as well as the gender for the participants shopping frequency. The participants most selected choice has been highlighted in the tables 27 and 28.

Chi-square tests were executed to the tables mentioned above to analyse and speculate the significance of participants age and gender on the trust on online shopping in social media, and their related chi-square values and p-values are documented in the table 29.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on trust on social commerce and recommended system:

Table 29: Overview with the chi-square test and p-value

Table Number	Hypothesis 4	Table Description	Chi-square value	P-value
Table 21	*Trust has a significant and positive relationship with consumer decisions to adopt social commerce.*	Suggestions made in Facebook affect your decision of shopping online on social media with respect to age	21.133	0.063
Table 23		Rate social commerce marketing suggestion made to you by Facebook with respect to age	35.248	0.102
Table 25		Social Commerce based of Brand Loyalty with respect to age	10.413	0.053
Table 27		Shopping Frequency with respect to age	39.405	0.050
Table 22		Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender	4.976	0.097
Table 24		Rate social commerce marketing suggestion made to you by Facebook with respect to gender	1.969	0.291
Table 26		Social Commerce based of Brand Loyalty with respect to gender	1.097	0.784
Table 28		Shopping Frequency with respect to gender	4.405	0.372

From the above Table 29, it is apparent that the chi-square tests performed on few of the variables do recognize the connection between participants and survey questions about trust on social commerce, the p-value is lesser than or equal to 0.05.

As p 0.05, *H4* cannot be dismissed as there is an association between the participants and the trust in social commerce.

5.6.5 Significance of Loyalty in Social commerce:

This section provides a detailed illustration of the relationship between loyalty and end-users' decision to adopt social commerce. This analysis is performed using both age and gender as the factor to understand the end-users perceptive by identifying the relationship between the

age and significance of loyalty of shopping online using social media. Likewise, gender and significance of loyalty of shopping online using social media

This analysis was executed using the cross-tabulation between each of the survey questions about the loyalty of social commerce concerning both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, the gender of the participants, dependent variables and the loyalty of end-users' in terms of social commerce.

H5: Loyalty has a significant and positive relationship with consumer decisions to adopt social commerce.

Social Commerce based of Brand Loyalty with respect to all age groups:

Table 30: Social Commerce based of Brand Loyalty with respect to age

Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Maybe	20.0%	50.0%	38.7%	48.0%	60.0%	66.7%	46.8%
No	20.0%	9.4%	11.3%	20.0%	15.0%	11.1%	14.8%
Yes	60.0%	37.5%	50.0%	32.0%	25.0%	22.2%	37.9%

Social Commerce based of Brand Loyalty with respect to gender:

Table 31: Social Commerce based of Brand Loyalty with respect to gender

Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Maybe	46.7%	46.4%	100.0%	0.0%	46.8%
No	12.4%	17.5%	0.0%	0.0%	14.8%
Yes	40.0%	36.1%	0.0%	0.0%	37.9%

Table 30 and Table 31categorises the cross-tabulation of age concerning social commerce based on brand loyalty as well as the gender for social commerce based on brand loyalty. The participants most selected choice has been highlighted in the tables 30 and 31.

Chi-square tests were executed to the table mentioned above to analyse and speculate the significance of participants age and gender on the loyalty on online shopping in social media, and their related chi-square values and p-values are documented in the table 32.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on brand loyalty on social commerce and recommended system:

Table 32: Overview with the chi-square test and p-value

Table Number	Hypothesis 5	Table Description	Chi-square value	P-value
Table 30	*Loyalty has a significant and positive relationship with consumer decisions to adopt social commerce*	Social Commerce based of Brand Loyalty with respect to age	10.413	0.053
Table 31		Social Commerce based of Brand Loyalty with respect to gender	1.097	0.784

From the above Table 32, it is apparent that the chi-square tests performed on one of the aspects does recognize the connection between participants and survey questions about brand loyalty on social commerce, the p-value is lesser than or equal to 0.05.

As p 0.05, *H5* cannot be dismissed as there is an association between the participants and brand loyalty on social commerce.

5.6.6 Significance of Variety in Social commerce:

This section provides a detailed illustration of the relationship between a variety of options available and end-users' decision to adopt social commerce. This analysis is performed using both age and gender as the factor to understand the end-users perceptive by identifying the relationship between the age and significance of a variety of shopping online using social media. Likewise, gender and significance of a variety of shopping online using social media. This analysis was executed using the cross-tabulation between each of the survey questions in relation to the variety of social commerce concerning both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, the gender of the participants, dependent variables and variety available for end-users' in terms of social commerce.

H6: Variety of services has a significant and positive relationship with consumer decisions to adopt social commerce.

Clickstreams on the marketing suggestions based on social commerce with respect to all age groups:

Table 33: Clickstreams on the marketing suggestions based on social commerce with respect to age

On average, how many times do you click on the marketing advertisements on Facebook?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	9.4%	16.1%	13.3%	15.0%	11.1%	14.3%
Frequently	20.0%	21.9%	8.1%	16.0%	15.0%	22.2%	14.8%
Sometimes	40.0%	40.6%	37.1%	25.3%	40.0%	0.0%	32.0%
Rarely	0.0%	21.9%	17.7%	21.3%	20.0%	22.2%	19.7%
Never	0.0%	6.3%	21.0%	22.7%	10.0%	44.4%	18.7%

Clickstreams on the marketing suggestions based on social commerce with respect to gender:

Table 34: Clickstreams on the marketing suggestions based on social commerce with respect to gender

On average, how many times do you click on the marketing advertisements on Facebook?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	16.2%	11.3%	100.0%	0.0%	14.3%
Frequently	14.3%	15.5%	0.0%	0.0%	14.8%
Sometimes	32.4%	32.0%	0.0%	0.0%	32.0%
Rarely	17.1%	22.7%	0.0%	0.0%	19.7%
Never	20.0%	17.5%	0.0%	0.0%	18.7%

Table 33 and Table 34 classifies the cross-tabulation of age concerning clickstreams on the marketing suggestions based on social commerce as well as the gender for clickstreams on the marketing suggestions based on social commerce. The participants most selected choice has been highlighted in the tables 33 and 34.

Relevancy of the suggestions made on social media to end user with respect to all age groups:

Table 35: Relevancy of the suggestions made on social media to end user with respect to age

Are the marketing suggestions on your Facebook page relevant to you?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	60.0%	28.1%	16.1%	10.7%	20.0%	11.1%	17.2%
Frequently	20.0%	12.5%	29.0%	22.7%	15.0%	22.2%	22.2%
Sometimes	0.0%	37.5%	35.5%	40.0%	25.0%	11.1%	34.5%
Rarely	20.0%	15.6%	14.5%	14.7%	35.0%	44.4%	18.2%
Never	0.0%	6.3%	4.8%	9.3%	5.0%	11.1%	6.9%

Relevancy of the suggestions made on social media to end user with respect to gender:

Table 36: Relevancy of the suggestions made on social media to end user with respect to gender

Are the marketing suggestions on your Facebook page relevant to you?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	19.0%	14.4%	100.0%	0.0%	17.2%
Frequently	28.6%	15.5%	0.0%	0.0%	22.2%
Sometimes	32.4%	37.1%	0.0%	0.0%	34.5%
Rarely	15.2%	21.6%	0.0%	0.0%	18.2%
Never	3.8%	10.3%	0.0%	0.0%	6.9%

Table 35 and Table 36 assigns the cross-tabulation of age concerning the relevancy of the suggestions made on social media to end-user as well as the gender for the relevancy of the suggestions made on social media to end-user. The participants most selected choice has been highlighted in the tables 35 and 36.

Reliable suggestions made on social media with respect to all age groups:

Table 37: Reliable suggestions made on social media with respect to age

Do you think the recommended advertisements on Facebook are reliable?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	60.0%	15.6%	8.1%	17.3%	40.0%	11.1%	17.2%
Frequently	40.0%	21.9%	38.7%	17.3%	10.0%	11.1%	24.1%
Sometimes	0.0%	46.9%	29.0%	38.7%	25.0%	44.4%	35.0%
Rarely	0.0%	6.3%	16.1%	22.7%	20.0%	33.3%	17.7%
Never	0.0%	6.3%	8.1%	2.7%	5.0%	0.0%	4.9%

Reliable suggestions made on social media with respect to gender:

Table 38: Reliable suggestions made on social media with respect to gender

Do you think the recommended advertisements on Facebook are reliable?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	21.9%	12.4%	0.0%	0.0%	17.2%
Frequently	24.8%	23.7%	0.0%	0.0%	24.1%
Sometimes	30.5%	39.2%	100.0%	0.0%	35.0%
Rarely	17.1%	18.6%	0.0%	0.0%	17.7%
Never	4.8%	5.2%	0.0%	0.0%	4.9%

Table 37 and Table 38 classes the cross-tabulation of age concerning the reliability of suggestions made on social media as well as the gender for the reliability of suggestions made on social media. The participants most selected choice has been highlighted in the tables 37 and 38.

Recommend the suggested advertisements on Facebook to your family and friends with respect to all age groups:

Table 39: Recommend the suggested advertisements on Facebook to your family and friends with respect to age

Do you recommend the suggested advertisements on Facebook to your family and friends?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	15.6%	9.7%	12.0%	10.0%	11.1%	12.3%
Frequently	20.0%	12.5%	21.0%	14.7%	10.0%	22.2%	16.3%
Sometimes	20.0%	40.6%	33.9%	21.3%	40.0%	11.1%	29.6%
Rarely	20.0%	25.0%	12.9%	21.3%	20.0%	22.2%	19.2%
Never	0.0%	6.3%	22.6%	29.3%	20.0%	33.3%	22.2%

Recommend the suggested advertisements on Facebook to your family and friends with respect to gender:

Table 40: Recommend the suggested advertisements on Facebook to your family and friends with respect to gender

Do you recommend the suggested advertisements on Facebook to your family and friends?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	14.3%	9.3%	100.0%	0.0%	12.3%
Frequently	21.9%	10.3%	0.0%	0.0%	16.3%
Sometimes	27.6%	32.0%	0.0%	0.0%	29.6%
Rarely	18.1%	20.6%	0.0%	0.0%	19.2%
Never	18.1%	26.8%	0.0%	0.0%	22.2%

Table 39 and Table 40 categorises the cross-tabulation of age concerning recommending the suggested advertisements on Facebook to your family and friends as well as the gender for recommending the suggested advertisements on Facebook to your family and friends. The participants most selected choice has been highlighted in the tables 39 and 40.

Chi-square tests were executed to the tables mentioned above to analyse and speculate the significance of participants age and gender on the variety of options available in online shopping in social media, and their related chi-square values and p-values are documented in the table 41.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on a variety of options on social commerce and recommended systems:

Table 41: Overview with the chi-square test and p-value

Table Number	Hypothesis 6	Table Description	Chi-square value	P-value
Table 33	*Variety of services has a significant and positive relationship with consumer decisions to adopt social commerce*	Clickstreams on the marketing suggestions based on social commerce with respect to age	23.937	0.054
Table 35		Relevancy of the suggestions made on social media to end user with respect to age	28.626	0.006
Table 37		Reliable suggestions made on social media with respect to age	39.975	0.006
Table 39		Recommend the suggested advertisements on Facebook to your family and friends with respect to age	23.394	0.006
Table 34		Clickstreams on the marketing suggestions based on social commerce with respect to gender	1.846	0.609
Table 36		Relevancy of the suggestions made on social media to end user with respect to gender	9.058	0.009
Table 38		Reliable suggestions made on social media with respect to gender	3.844	0.009
Table 40		Recommend the suggested advertisements on Facebook to your family and friends with respect to gender	2.175	0.337

From the above Table 41, it is apparent that the chi-square tests performed on most of the variables does recognize the connection between participants and survey questions about a variety of options on social commerce and recommended systems, the p-value is lesser than or equal to 0.05.

As p 0.05, *H6* cannot be dismissed as there is an association between the participants and the variety of options on social commerce and recommended systems.

5.6.7 Significance of Efficiency in Social commerce

This section provides a detailed illustration of the relationship between the efficiency of social commerce. This analysis is performed using both age and gender as the factor to

understand the end-users perceptive by identifying the relationship between the age and significance of efficiency of social commerce — likewise, gender and significance of efficiency of social commerce.

This analysis was executed using the cross-tabulation between each of the survey questions about the variety of social commerce concerning both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, the gender of the participants, dependent variables and efficiency for end-users' in terms of social commerce.

H7: Efficiency has a significant and positive relationship with consumer decisions to adopt social commerce.

Shopping Frequency with respect to all age groups:

Table 42: Shopping Frequency with respect to age

On an average, how often do you shop?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
More than once a day	40.0%	15.6%	8.1%	16.0%	15.0%	11.1%	13.8%
More than once a month	0.0%	9.4%	8.1%	17.3%	5.0%	0.0%	10.8%
More than once a week	0.0%	9.4%	14.5%	5.3%	25.0%	0.0%	10.3%
Once a Day	20.0%	0.0%	3.2%	4.0%	0.0%	11.1%	3.4%
Once a month	20.0%	34.4%	30.6%	20.0%	40.0%	11.1%	27.1%
Once a week	20.0%	21.9%	21.0%	16.0%	0.0%	22.2%	17.2%
Others	0.0%	9.4%	14.5%	21.3%	15.0%	33.3%	16.7%

Shopping Frequency with respect to gender:

Table 43: Shopping Frequency with respect to gender

On an average, how often do you shop?					
Response	Gender				Total
	Female	Male	Do not want to state	Others	
More than once a day	17.1%	10.3%	0.0%	0.0%	13.8%
More than once a month	10.5%	11.3%	0.0%	0.0%	10.8%
More than once a week	8.6%	12.4%	0.0%	0.0%	10.3%
Once a Day	1.9%	4.1%	100.0%	0.0%	3.4%
Once a month	25.7%	28.9%	0.0%	0.0%	27.1%
Once a week	20.0%	14.4%	0.0%	0.0%	17.2%
Others	16.2%	17.5%	0.0%	0.0%	16.7%

Table 42 and Table 43 classifies the cross-tabulation of age concerning participants shopping frequency as well as the gender for the participants shopping frequency. The participants most selected choice has been highlighted in the tables 42 and 43.

Recommend the suggested advertisements on Facebook to your family and friends with respect to all age groups:

Table 44: Recommend the suggested advertisements on Facebook to your family and friends with respect to age

Do you recommend the suggested advertisements on Facebook to your family and friends?							
Response	Age Group (In years)						Total
	18-20	21-25	26-30	31-40	41-60	60+	
Always	40.0%	15.6%	9.7%	12.0%	10.0%	11.1%	12.3%
Frequently	20.0%	12.5%	21.0%	14.7%	10.0%	22.2%	16.3%
Sometimes	20.0%	40.6%	33.9%	21.3%	40.0%	11.1%	29.6%
Rarely	20.0%	25.0%	12.9%	21.3%	20.0%	22.2%	19.2%
Never	0.0%	6.3%	22.6%	29.3%	20.0%	33.3%	22.2%

Recommend the suggested advertisements on Facebook to your family and friends with respect to gender:

Table 45: Recommend the suggested advertisements on Facebook to your family and friends with respect to gender

Do you recommend the suggested advertisements on Facebook to your family and friends?					
Response	Gender				Total
	Female	Male	Do not want to state	Other	
Always	14.3%	9.3%	100.0%	0.0%	12.3%
Frequently	21.9%	10.3%	0.0%	0.0%	16.3%
Sometimes	27.6%	32.0%	0.0%	0.0%	29.6%
Rarely	18.1%	20.6%	0.0%	0.0%	19.2%
Never	18.1%	26.8%	0.0%	0.0%	22.2%

Table 44 and Table 45 assigns the cross-tabulation of age concerning recommending the suggested advertisements on Facebook to your family and friends as well as the gender for recommending the suggested advertisements on Facebook to your family and friends. The participants most selected choice has been highlighted in the tables 44 and 45.

Chi-square tests were executed to the tables mentioned above to analyse and speculate the significance of participants age and gender on the variety of options available in online shopping in social media, and their related chi-square values and p-values are documented in the table below.

Overview of chi-square tests executed in order to distinguish the significance of age and gender on the efficiency of social commerce and recommended systems:

Table 46: Overview with the chi-square test and p-value

Table Number	Hypothesis 7	Table Description	Chi-square value	P-value
Table 42	*Efficiency has a significant and positive relationship with consumer decisions to adopt social commerce*	Shopping Frequency with respect to age	39.405	0.051
Table 43		Recommend the suggested advertisements on Facebook to your family and friends with respect to age	23.394	0.006
Table 44		Shopping Frequency with respect to gender	4.405	0.372
Table 45		Recommend the suggested advertisements on Facebook to your family and friends with respect to gender	2.175	0.337

From the above Table 46, it is apparent that the chi-square tests performed on few of the variables do recognize the connection between participants and survey questions about the efficiency of social commerce and recommended systems, the p-value is lesser than or equal to 0.05.

As p 0.05, *H7* cannot be dismissed as there is an association between the participants and the efficiency of social commerce and recommended systems.

5.6.8 Significance of Intention and Attitude in Social commerce

H8: There is a positive association between end users' intention to use online shopping on social media and their attitude towards it.

This section illustrates the relationship between intention and attitude of end-users' in terms of social commerce. All the survey mentioned above questions includes intention and attitude as criteria and thus, the analysis performed using both age and gender as the factor to understand the end-users perceptive by identifying the relationship between the age and significance of intention and attitude of social commerce — likewise, gender and significance of intention and attitude of social commerce.

This analysis was executed using the cross-tabulation between each of the survey questions about the variety of social commerce concerning both age and gender of the participants to determine the chi-square test and the p-value.

The p-value is used to establish the link between the independent variable, age of the participants, the gender of the participants, dependent variables and attitude and intention for end-users' in terms of social commerce.

Overview of chi-square tests executed in order to distinguish the significance of age and gender-based on intention and attitude end users on social commerce and recommended systems:

Table 47: Overview with the chi-square test and p-value

Table Number	Hypothesis 8	Table Description	Chi-square value	P-value
Table 2	*There is a positive association between end users' intention to use online shopping on social media and their attitude towards it*	Preferred Shopping method with respect to age	7.612	0.022
Table 4		Shopping Frequency with respect to age	39.405	0.051
Table 7		Notification from Facebook to shop based on Previous shopping history with respect to age	28.716	0.077

Table 9		Suggestions made in Facebook affect your decision of shopping online on social media with respect to age	21.133	0.063
Table 12		Rate social commerce marketing suggestion made to you by Facebook with respect to age	35.248	0.102
Table 14		Social Commerce based of Brand Loyalty with respect to age	10.413	0.053
Table 16		Clickstreams on the marketing suggestions based on social commerce with respect to age	23.937	0.054
Table 18		Recommend the suggested advertisements on Facebook to your family and friends with respect to age	23.394	0.006
Table 35		Relevancy of the suggestions made on social media to end user with respect to age	28.626	0.006
Table 37		Reliable suggestions made on social media with respect to age	39.975	0.006
Table 3		Preferred Shopping method with respect to gender	2.175	0.337
Table 5		Shopping Frequency with respect to gender	4.405	0.372
Table 8		Notification from Facebook to shop based on Previous shopping history with respect to gender	3.008	0.130
Table 10		Suggestions made in Facebook affect your decision of shopping online on social media with respect to gender	4.976	0.097
Table 13		Rate social commerce marketing suggestion made to you by Facebook with respect to gender	1.969	0.291
Table 15		Social Commerce based of Brand Loyalty with respect to gender	1.097	0.784
Table 17		Clickstreams on the marketing suggestions	1.846	0.609

		based on social commerce with respect to gender		
Table 19		Recommend the suggested advertisements on Facebook to your family and friends with respect to gender	2.175	0.337
Table 36		Relevancy of the suggestions made on social media to end user with respect to gender	9.058	0.009
Table 38		Reliable suggestions made on social media with respect to gender	3.844	0.009

From the Table 47, it is apparent that the chi-square tests performed on few of the variables do recognize the connection between participants and survey questions about intention and attitude of end-users on social commerce and recommended systems, the p-value is lesser than or equal to 0.05.

As p 0.05, *H8* cannot be dismissed as there is an association between the participants and the intention and attitude of end-users on social commerce and recommended systems.

5.7 Summary

In conclusion to the analysis performed above were done using the SPSS, an IBM statistical analytics tool. The survey was conducted using an online portal (Qualtrics.com), the data was then exported to excel from the online portal, and suitable tests were performed using SPSS. Chi-square tests were performed on each of the hypothesis to recognize the connection between the survey questions and the hypothesis. P-value was then derived with the help of the chi-square test.

From the above analysis, it is evident that regardless of age and gender, there was no connection between the perceived ease of use and social commerce and recommender systems from the end-users perceptive.

The following section justifies the results collected from the above analysis and discovers answers to each of the research question listed in section 5.6

6 Discussion

6.1 Introduction

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying from the age group of 18 to above 60 years of age. The analysis was performed using SPSS from the data derived. Chi-square tests were performed on each survey question concerning age and gender to calculate the p-value. With the help of the p-value derived, the hypothesis was established as rejected or accepted. This segment discovers answers to each of the research question listed in section 2.3.

A brief description of the results derived from the analysis executed on the survey question will be discussed. A detailed discussion of each answer for the research question will be presented in this segment. Section 6.1 will discuss the answers to the research questions RQ1, RQ1.1, RQ1.2, RQ1.3, RQ1.4, RQ1.5, RQ1.6

The answer to RQ1.6 was not obtained in the conducted online survey.

6.1.1 Factors that influence recommender systems in Facebook:

This section answers the research questions RQ1 and RQ1.5. The section starts with the result derived using the chi-square test on the data gathered from the survey in section 5.6 and follows by to explains the factors that influence recommender systems on Facebook from an end-users perceptive.

6.1.2 Discussion on results based on p-value:

This segment examines the chi-square analysis executed between the dependent and independent variables. Every one of the hypotheses was tested against important survey questions to investigate the connection between the dependent and independent variables. Figure 18 gives a rundown of the analysis executed in section 5.6 and represents the presence and non-presence of connections between the variables. The below segments give an accurate representation of the analysis executed to answer every one of the hypotheses.

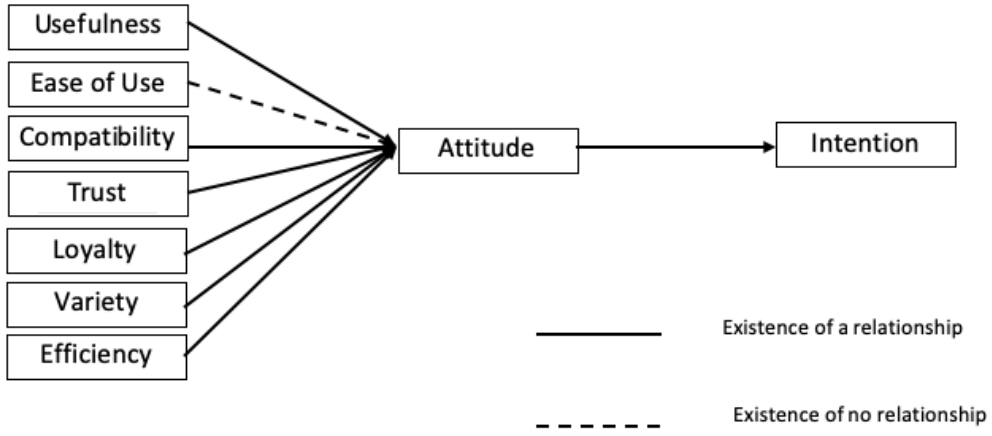

Figure 17 Existence of a relation between variables

6.1.2.1 Significance of age and gender in perceived usefulness:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and the perceived usefulness of social commerce and recommender systems from the end-users perceptive. The survey questions associated with perceived usefulness were SQ3, SQ4, SQ8 and SQ9. These questions ranged from the preferred method of shopping to the frequency of shopping online based on Facebook. Figure 19 signifies the independent variables and dependent variables. Significance between age and gender in perceived usefulness is discussed based on the descriptive analysis performed.

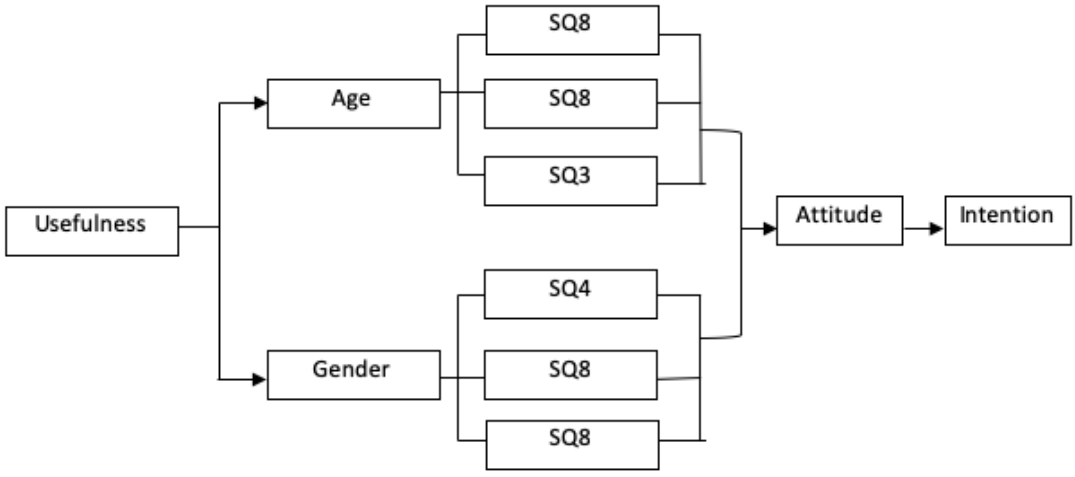

Figure 18: Survey Questions related to age, gender and perceived usefulness

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, gender of the participants and the participants view on perceived

usefulness for social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in the perceived usefulness of social commerce and recommender systems from an end-users perceptive (C.-Y. Li & Ku, 2018; A. Y. L. Chong et al., 2018).

Thus, from the results, it can be concluded that age and gender do have a significant influence on perceived usefulness of social commerce and recommender systems from end-users perceptive.

6.1.2.2 Significance of age and gender in perceived ease of use:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and the perceived ease of use on social commerce and recommender systems from the end-users perceptive. The survey questions associated with perceived ease of use were SQ3, SQ4, SQ11 and SQ16. These questions ranged from notification based on previous shopping history to the suggestions of the notifications affect the decision of shopping online on social media based on Facebook. Figure 20 signifies the independent variables and dependent variables. Significance of age and gender in perceived ease of use is discussed based on the descriptive analysis performed.

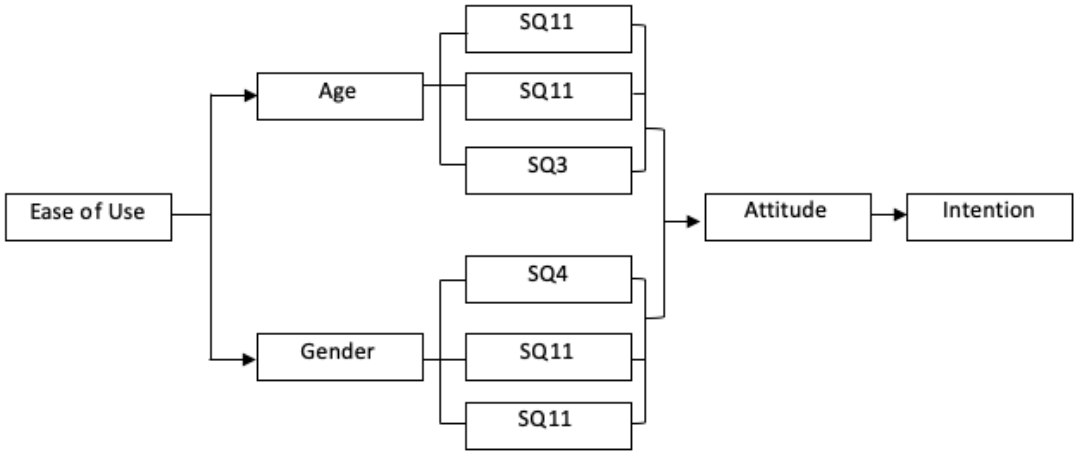

Figure 19 Survey Questions related to age, gender and perceived ease of use

From the descriptive analysis performed it was evident that there is no connection between the age of the participants, gender of the participants and the participants view on perceived

ease of use for social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do not have a significance in the perceived ease of use of social commerce and recommender systems from end users perceptive (Liébana-Cabanillas & Alonso-Dos-Santos, 2017; Goswami, 2017).
Thus, from the results, it can be concluded that age and gender do not have a significant influence on perceived ease of use of social commerce and recommender systems from end users perceptive.

6.1.2.3 Significance of compatibility with respect to age and gender:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and the compatibility of social commerce and recommender systems from the end-users perceptive. The survey questions associated with compatibility were SQ3, SQ4, SQ15, SQ18, SQ12 and SQ14. These questions ranged from clicking on the notifications posted, suggesting the notification friends and family, rating the suggestions received to shopping based on a brand on Facebook. Figure 21 signifies the independent variables and dependent variables. Significance of compatibility for age and gender of the participants is discussed based on the descriptive analysis performed.

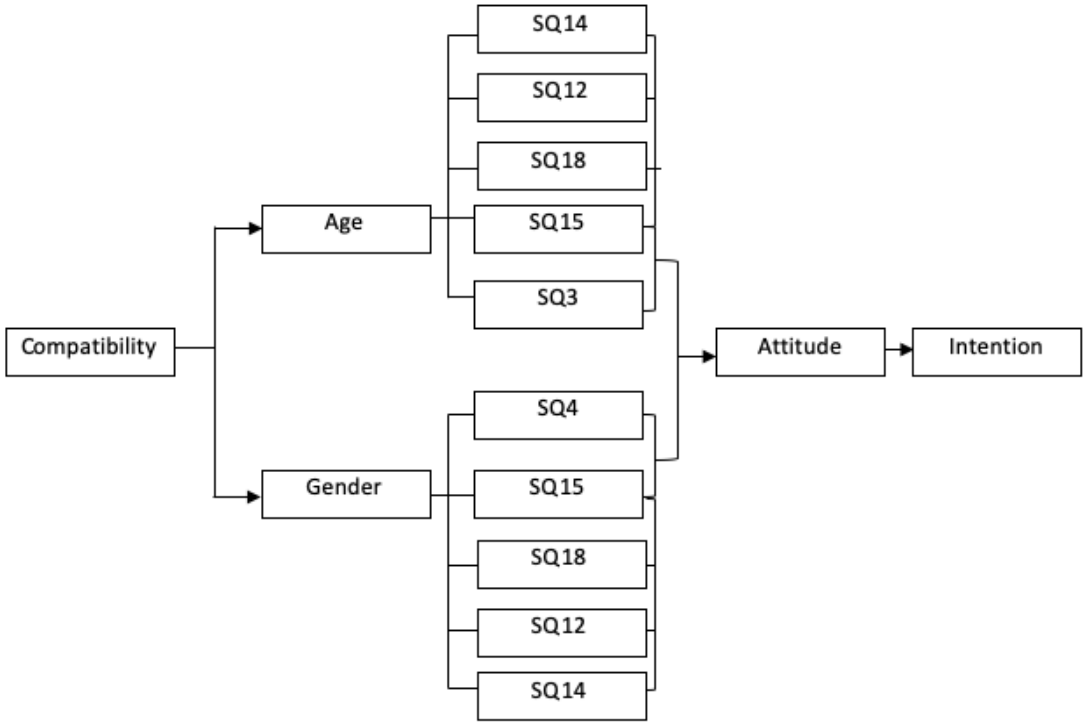

Figure 20 Survey Questions related to age, gender and compatibility

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, gender of the participants and the participants view on the compatibility of social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in the compatibility of social commerce and recommender systems from an end-user perceptive (Hayashi et al., 2018; Choi et al., 2015).

Thus, from the results, it can be concluded that age and gender do have a significant influence on the compatibility of social commerce and recommender systems from an end-user perceptive.

6.1.2.4 Significance of trust with respect to age and gender:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and the perceived usefulness of social commerce and recommender systems from the end-users perceptive. The survey questions associated with trust were SQ3, SQ4, SQ16, SQ15, SQ18 and SQ9. These questions ranged from the frequency of shopping online, rating the suggestions received, the suggestions of the notifications affect the decision of shopping online on social media to shopping based on a brand with respect to Facebook. Figure 22 signifies the independent variables and dependent variables. Significance of

trust concerning age and gender of the participants is discussed based on the descriptive analysis performed.

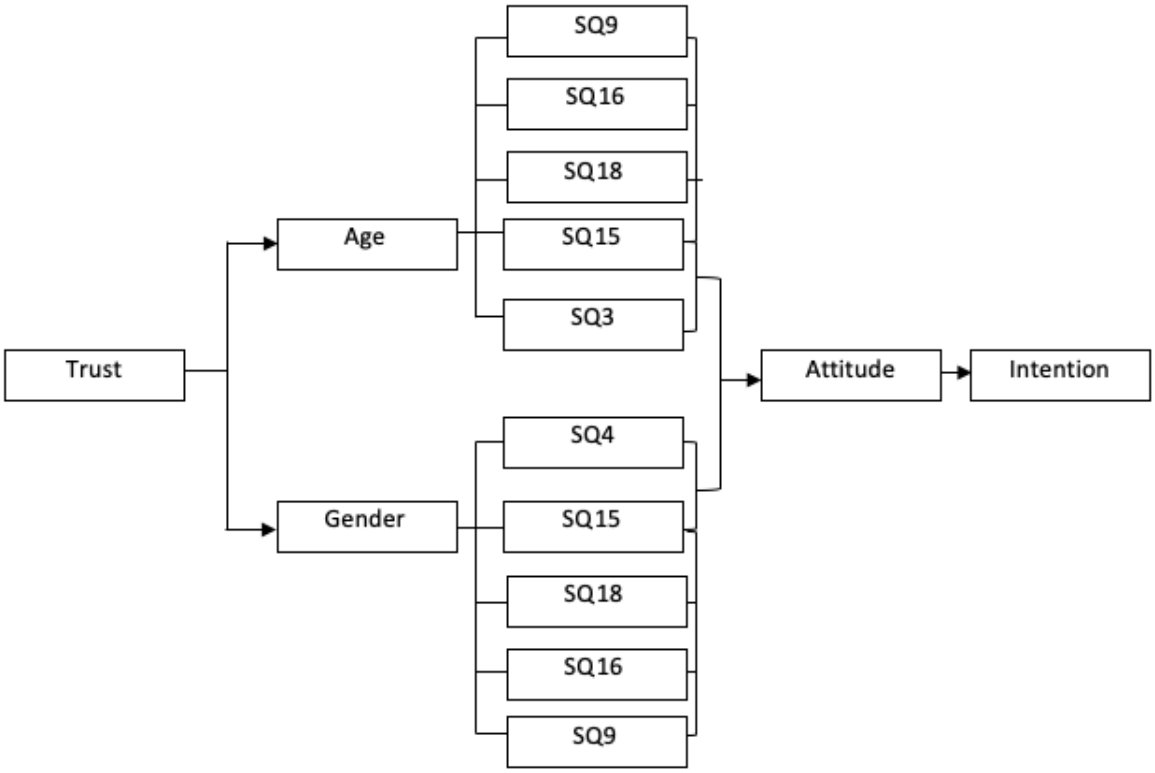

Figure 21 Survey Questions related to age, gender, and trust

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, gender of the participants and the participants view on trust in social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in trust aspect of social commerce and recommender systems from an end-user perceptive (Sharma et al., 2019; Yahia et al., 2018; Jiang et al., 2019; Leong et al., 2017).
Thus, from the results, it can be concluded that age and gender do have a significant influence on trust in social commerce and recommender systems from an end-user perceptive.

6.1.2.5 Significance of Loyalty with respect to age and gender:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and loyalty aspect in social

commerce and recommender systems from the end-users perceptive. The survey questions associated with loyalty were SQ3, SQ4, and SQ18. These questions relate to shopping based on the brand with respect to Facebook. Figure 23 signifies the independent variables and dependent variables. Significance of loyalty concerning age and gender of the participants is discussed based on the descriptive analysis performed.

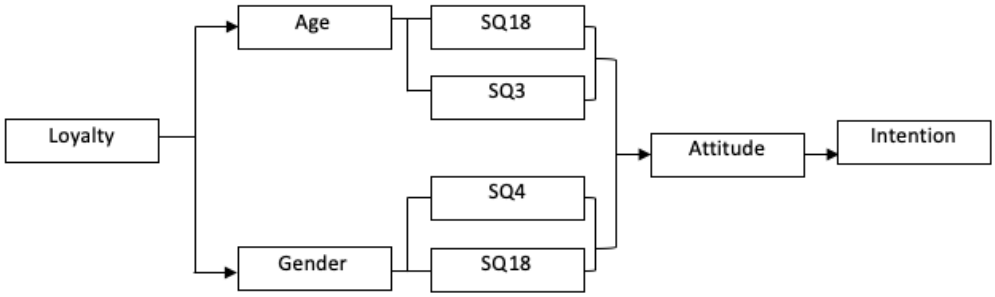

Figure 22: Survey Questions related to age, gender and loyalty

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, gender of the participants and the participants view on brand loyalty in social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in the loyalty in social commerce and recommender systems from an end-user perceptive (Hwangbo, Kim, & Cha, 2018; Y.-L. Wu & Li, 2017).
Thus, from the results, it can be concluded that age and gender do have a significant influence on brand loyalty in social commerce and recommender systems from an end-user perceptive.

6.1.2.6 Significance of variety of options with respect to age and gender:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and variety of options in social commerce and recommender systems from the end-users perceptive. The survey questions associated with a variety were SQ3, SQ4, SQ12, SQ13, SQ14 and SQ17. These questions ranged from clicking on the notifications posted, the relevancy of the notifications, suggesting the notification friends and family to the reliability of these notifications based on Facebook. Figure 24 signifies the independent variables and dependent variables. Significance of variety concerning age and gender of the participants is discussed based on the descriptive analysis performed.

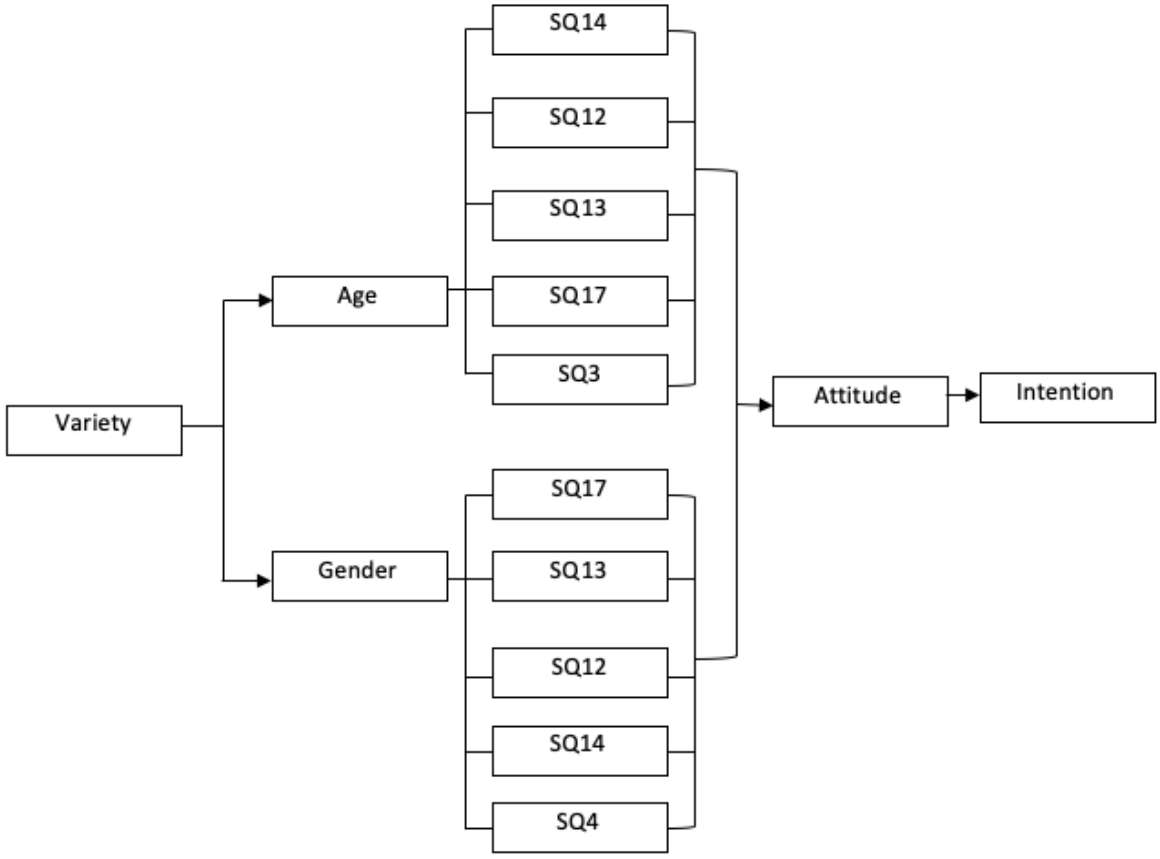

Figure 23: Survey Questions related to age, gender and variety

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, gender of the participants and the participants view on a variety of option in social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in the variety of option in social commerce and recommender systems from an end-user perceptive (Liang & Turban, 2016).

Thus, from the results, it can be concluded that age and gender do have a significant influence on variety of option in social commerce and recommender systems from an end-user perceptive.

6.1.2.7 Significance of efficiency with respect to age and gender:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and the efficiency of social commerce and recommender systems from the end-users perceptive. The survey questions associated

with efficiency were SQ3, SQ4, SQ14 and SQ9. These questions ranged from the frequency of shopping online to suggesting the notification friends and family based on Facebook. Figure 25 signifies the independent variables and dependent variables. Significance of efficiency concerning age and gender of the participants is discussed based on the descriptive analysis performed.

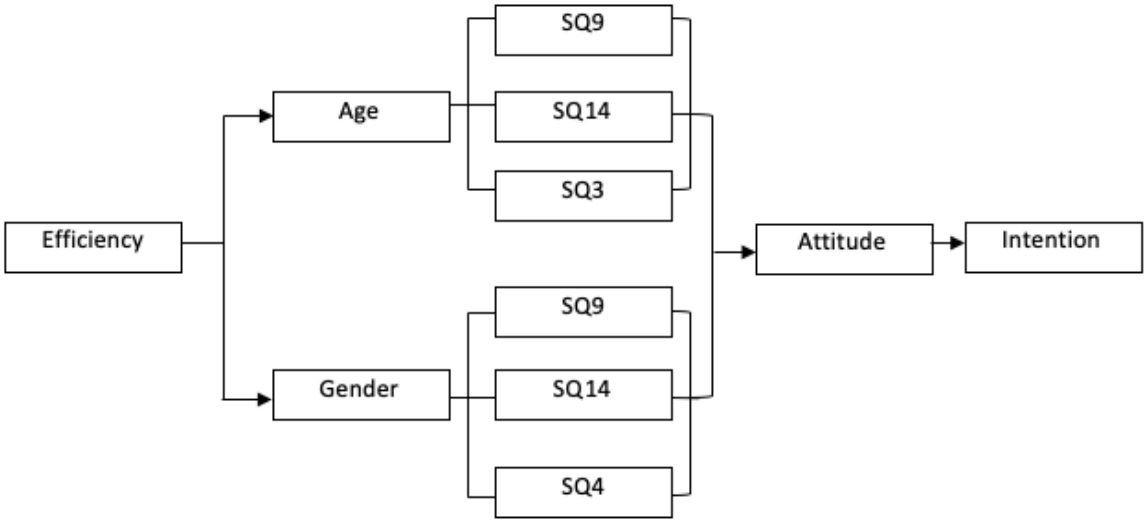

Figure 24: Survey Questions related to age, gender and efficiency

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, gender of the participants and the participants view on efficiency for social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in the efficiency of social commerce and recommender systems from an end-user perceptive (Liébana-Cabanillas & Alonso-Dos-Santos, 2017; S. S. Abed, Dwivedi, & Williams, 2015).

Thus, from the results, it can be concluded that age and gender do have a significant influence on efficiency of social commerce and recommender systems from an end-user perceptive.

6.1.2.8 Significance of Intention and Attitude with respect to age and gender:

This segment discusses the detailed analysis performed on the data derived from an online survey from 202 participants varying in different age groups and gender. Understanding the significance of independent variables, dependent variables such as age and gender and the intention and attitude in social commerce and recommender systems from the end-users perceptive. The survey questions associated with perceived usefulness were SQ3, SQ4, SQ8, SQ9, SQ11, SQ12, SQ13, SQ14, SQ15,

SQ16, SQ17 and SQ18. These questions are discussed in the above sections. Intention and attitude of a participant comprises in section 6.1.2

From the descriptive analysis performed it was evident that there is a connection between the age of the participants, the gender of the participants and the participants view on intention and attitude in social commerce and recommender systems from the end-users perceptive. These findings are in agreements with the findings from the previous researches and studies conducted, that indicate that age and gender do have a significance in the intention and attitude in social commerce and recommender systems from an end-user perceptive (Muhammad et al., 2018; Leong et al., 2018; Shen et al., 2019).

Thus, from the results, it can be concluded that age and gender do have a significant influence on intention and attitude in social commerce and recommender systems from an end-user perceptive.

6.2 Summary

This research concentrates on the two dependent variables and nine independent variables for social commerce and recommender systems. According to above discussion, it was apparent that the factors that influence the social commerce and recommender systems vary from perceived usefulness, compatibility, trust component, brand loyalty, variety of options, efficiency, intention and attitude of end-user. Each of the factors discussed also plays a massive role in benefiting the social commerce and recommender systems. From the analysis performed, it was also clear that perceived ease of use was not one of the criteria that influence social commerce and recommender systems. These results derived are backed by previously conduction experiments and studies.

Therefore, with the help of the previously conducted studies as well as the analysis carried out it is evident that except the easA2e of use all the other factors such as perceived usefulness, compatibility, trust component, brand loyalty, variety of options, efficiency, intention and attitude of end-user affect the social commerce and recommender system.

A summary description is provided in Table 48, which links the sections from the literature review, survey question, research question to discussion sections.

Table 48: Linking of Research Question, Hypothesis, Literature review and result discussion

Research Question	Survey Question	Literature Review	Discussion
RQ1	SQ3, SQ4, SQ15, SQ16, SQ9, SQ18, SQ13, SQ14, SQ17	3.6; 3.3; 3.4	6.1.2.4; 6.1.2.5; 6.1.2.6
RQ1.1	SQ9, SQ14, SQ8	3.3	6.1.2.1
RQ1.2	SQ12, SQ13, SQ17	3.6	6.1.2.6
RQ1.3	SQ15, SQ16, SQ18	3.6	6.1.2.5; 6.1.2.6; 6.1.2.3
RQ1.4	SQ15, SQ16	3.2	6.1.2.3; 6.1.2.7
RQ1.5	SQ10	3.4	6.1.2.1; 6.1.2.8

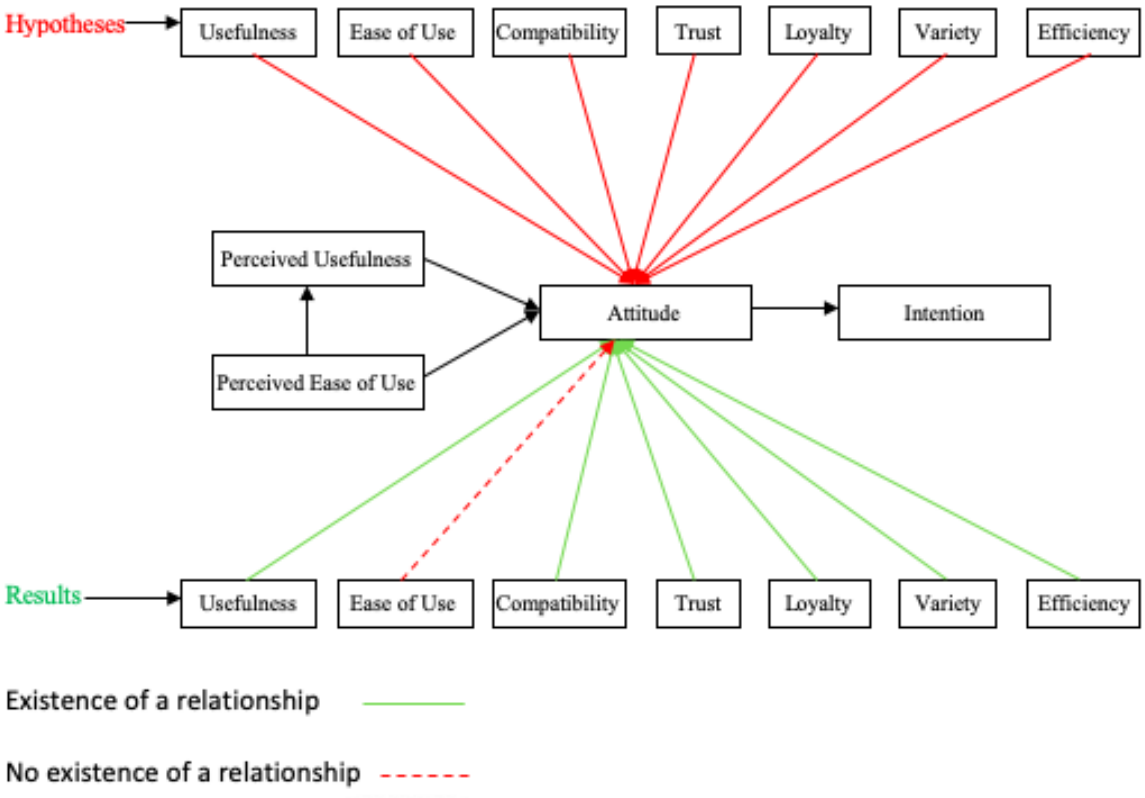

Figure 25: Linking Hypothesis and Results with TAM

Figure 25 describes the relationship between the hypotheses and the results. The ease of use signifies the non-existence of the relationship from previously conducted studies as well as the analysis is described in section 6.1.2.2. However, the other hypotheses proved to have a relationship from previously conducted studies as well as from the survey conducted. To achieve the results a chi-square analysis was performed using SPSS to obtain the p-value and based on the p- value and the previous studies, it is concluded that the relationship with ease

of use is non – existence, while the relationship with usefulness, compatibility, trust, brand loyalty, variety and efficiency exists.

The answer to the RQ1.6 “What are the disadvantages of recommended system on social media from an end user’s perspective?” was not obtained from the survey conducted.

7 Further Research

This research focused on the factors that influence social commerce and recommender system concerning Facebook. An online survey was conducted with 202 valid responses. The survey was conducted to understand the correlation and relevance between age, gender, Facebook users, online shoppers, a preferred method of shopping and recommended systems. Impacts of social media in social commerce is trending with all age groups, where shopping online has become a way of life. With social media playing a huge part in our life, it has become easy for organisations to take information from the end-users and provide the suggestions in the form of a recommender system. Thus, it becomes essential to understand the impacts of social media in social commerce.

A further study could be conducted on the factors that influence social commerce and recommender system for different social media platform such as Twitter, Instagram, Snapchat.

8 Conclusion

In conclusion, from the literature review, all things considered, it is believed that online shopping was preferred to the traditional shopping. Online product reviews, e-WOM as opposed to WOM, platform-based multi-sided marketplaces, clickstream database, promotional strategies, marketing in social media network namely Facebook, recommender system, sum up to the conclusion that the factors influence recommender system in the social media marketing or social commerce. Although this was proved using various models and experiments by different authors mentioned in this chapter.

Subsequently, the recommender system has become a necessity for e-commerce in this epoch.

This research used the defined hypotheses and redesigned the TAM model to answer the research questions listed in the proposal. The research method that was adopted was of an online survey method to gather responses from the participants. The proposed sampling technique, data gathering, and data analysis methods are inspected in this research paper. The ethical considerations and limitations of this research were also listed in this chapter.

The analysis performed above were done using the SPSS, an IBM statistical analytics tool. The survey was conducted using an online portal (Qualtrics.com), the data was then exported to excel from the online portal, and suitable tests were performed using SPSS.

Chi-square tests were performed on each of the hypothesis to recognize the connection between the survey questions and the hypothesis. P-value was then derived with the help of the chi-square test.

From the above analysis, it is evident that regardless of age and gender, there was no connection between the perceived ease of use and social commerce and recommender systems from the end-users perceptive.

Impacts of social media in social commerce is trending with all age groups, where shopping online has become a way of life. With social media playing a huge part in our life, it has become easy for organisations to take information from the end-users and provide the suggestions in the form of a recommender system. Thus, it becomes essential to understand the impacts of social media in social commerce.

According to the discussion, it was apparent that the factors that influence the social commerce and recommender systems vary from perceived usefulness, compatibility, trust component, brand loyalty, variety of options, efficiency, intention and attitude of the end-user. Each of the factors discussed also plays a massive role in benefiting the social

commerce and recommender systems. From the analysis, it was also clear that perceived ease of use was not one of the criteria that influence social commerce and recommender systems. These results derived are backed by previously conduction experiments and studies. Therefore, with the help of the previously conducted studies as well as the analysis carried out it is evident that except the ease of use all the other factor such as perceived usefulness, compatibility, trust component, brand loyalty, variety of options, efficiency, intention and attitude of end-user affect the social commerce and recommender system.

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Appendices:

Survey Questions

Survey Question No	Survey Question
S2	Are you over the age of 18 years?
	☐ Yes ☐ No
S3	To which age group do you belong to?
	☐ 18-20 ☐ 21-25 ☐ 26-30 ☐ 31-40 ☐ 41-60 ☐ 60+
S4	What is your gender?
	☐ Male ☐ Female ☐ Others ☐ Do not want to state
S5	Are you a regular user of social media?
	☐ Yes ☐ No
S6	Do you use Facebook?
	☐ Yes ☐ No
S7	On average, how often do you use Facebook?
	☐ Once per day ☐ More than once per day ☐ Once a month ☐ More than once a month ☐ Other, please state
S8	What is the method of shopping you prefer? (Usefulness)
	☐ Traditional ☐ Online ☐ Other, please specify ☐ Do not want to state
S9	On average, how often do you shop online? (Efficiency)

	☐ Once per day	☐ More than once per day	☐ Once a week	☐ More than once a week	☐ Once a month	☐ More than once a month	☐ Other, please state
S10	Do you shop online for special occasions such as birthdays or anniversaries? (Efficiency)						
	☐ Yes			☐ No	☐ Sometimes	☐ Never	
S11	On average, how many times do you get notifications to shop based on your previous shopping history on Facebook?						
	☐ Always	☐ Frequently	☐ Sometimes	☐ Rarely	☐ Never		
S12	On average, how many times do you click on the marketing advertisements on Facebook? (Compatibility)						
	☐ Always	☐ Frequently	☐ Sometimes	☐ Rarely	☐ Never		
S13	Are the marketing suggestions on your Facebook page relevant to you? (Variety)						
	☐ Always	☐ Frequently	☐ Sometimes	☐ Rarely	☐ Never		
S14	Do you recommend the suggested advertisements to your family and friends?						
	☐ Always	☐ Frequently	☐ Sometimes	☐ Rarely	☐ Never		
S15	How would you rate the marketing suggestions made for you on Facebook?						
	☐ Brilliant	☐ Above average	☐ Average	☐ Below average	☐ Poor		
S16	Do the suggestions made in Facebook affect your decision of shopping? (Trust)						

	☐ Always	☐ Frequently	☐ Sometimes	☐ Rarely	☐ Never
S17	Do you think the recommended advertisements are reliable?				
	☐ Always	☐ Frequently	☐ Sometimes	☐ Rarely	☐ Never
S18	Do you shop for the items suggested on your Facebook page based on brand loyalty, for instance, Amazon.com? (Loyalty)				
	☐ Yes		☐ No		☐ Maybe

A2: Ethics Forms

Wintec WAIKATO INSTITUTE OF TECHNOLOGY Te Kuratini o Waikato	Research and Postgraduate Office (RPGO) Human Ethics in Research Group (HERG)

LOW RISK HUMAN ETHICS IN RESEARCH APPLICATION FORM

Please refer to the Ethics Guidelines prior to completing this application.
The RPGO is located at the City Campus, D-Block (Offices D2.22 – D2.24), email research@wintec.ac.nz or phone Megan Allardice on Ext. 3582 for more information.

Please see the last page of this document for detailed instructions for completing this form.

1.0 PROJECT TITLE	
	Impact of Social Media on Social Commerce

2.0 RESEARCHER(S)		
2.1	Primary researcher's name	Moni Nagraj
2.2	School//Centre/Unit	Centre of Business and Information Technology
2.3	Contact Details (Telephone and E-mail)	Telephone: 0221656636 E-mail: monnag21@student.wintec.ac.nz
2.4	Is this application a:	☐ Student Application ☐ Staff Application
2.5	If this is a student application, please provide the Module code here	INFO901
2.6	Is this project a staff application that utilises work partially or wholly undertaken by students who are not participants (e.g. data collection undertaken by a researcher's class)?	No
2.7	If so, please clearly describe what the role of these students is to be in this research, what the work will be used for explicitly (including any issues regarding authorship of research outputs such as journal articles), and what steps have been taken to ensure students are aware of this.	Not applicable
2.8	Name of other Researcher(s) and positions. (If this is a student application please provide the name(s) of the project supervisor(s) and indicate that they are supervisors here.)	Dr. Kay Fielden
2.9	Contact Details of other researchers and/or supervisors (Telephone and E-mail)	E-mail: Kay.Fielden@wintec.ac.nz
2.10	Is this application:	☐ A new application ☐ A subsequent approval request following a significant change to an already approved application

3.0 PROJECT TIMELINE

	Projected start date for **data collection** *(once this ethics application is approved. Please note, projects can only begin once applications have been approved, regardless of the level of risk)*: July 2019 Projected end date: End of Semester

4.0 PROJECT SUMMARY (please include your research purpose and objectives, methodology will be dealt with in Section 6)

The research aims to understand the Impact of Social Media on Social Commerce. The purpose of the research would be to understand the aspects of e-commerce marketing in social media and the recommender system nature of e-commerce society. A research model based on the Technology Acceptance Model by Davis will be used to quantify the results and retrieve answers to the research questions (https://www.surveysystem.com/).

5.0 PROJECT METHODOLOGY (including methods for data collection)

For this research, a population size of 850,000 will be considered, with a confidence interval of 4 and a confidence level of 95%, hence generating a sample size of 600 (Source: Creative Research System, n.d.). The data will be analysed using statistical tests.

A research model based on the Technology Acceptance Model by Davis will be used to identify the Impact of Social Media on Social Commerce in which data is used for recommender system in social media marketing. This research will use online tools to analyse the results and retrieve answers to the research questions David et al. (1989).

6.0 CONSIDERATON OF ETHICAL ISSUES AND PROCESSES

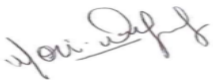
Please describe below the process that you have undergone in order to discuss and analyse the ethical issues present in this project. (For example, who have you consulted in regard to ethical issues or in completing the screening questionnaire and this Low Risk application)

All points from screening questions have been taken into consideration as to not affect any party involved in the research. This has been consulted with the primary supervisor.

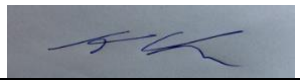
Risk of harm
No harm would be caused either physical or psychological during the research
Informed and voluntary consent
This research will not include participants without written consent
Privacy and confidentiality
No personal or sensitive data will be collected; the participant will remain anonymous.
Deception
There will be no deception of participants, including concealment and covert observations.
Conflict of interest
There are no conflicts of interest for the researcher.
Compensation of participants
There will be no form of payment or financial exchange in this research.
Procedural
This research does not demand any additional ethical requirement or approval from an outside organisation.
Treaty of Waitangi and Maori participation
Māori are not the prime focus of this project.
Other cultural consideration
This research does not single out any ethnic group, and no components of this research might support particular cultural issue.
Health and disability research committee review

The participants of this research are not expected to engage in their ability as consumers of health or disability support services, or relatives or caregivers of consumers of health or disability support services.

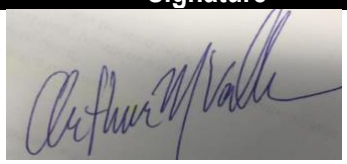
Researcher(s) signature(s) (the name and signature of all researcher(s) are to be included):

Name	Signature	Date
Moni Nagraj		17/06/19

Primary Supervisor's signature (if this is a student application):

Name	Signature	Date
Dr Kay Fielden		17/7/19

Research Leader's signature:

Name	Signature	Date
Dr Arthur Valle		17.07.2019

HERG Chairperson or delegated representative's signature (RPGO use only):

Name	Signature	Date

COMPLETING THIS FORM

Please note: A low risk research project is one in which the nature of the potential/actual risk of harm to participants or the researcher is minimal and no more than is normally encountered in daily life. If, as a staff member, you are new to research or are in any doubt as to which application to submit, please consult with your Research Leader. If you are a student, your supervisor will be able to give you advice. If you are still in any doubt, don't hesitate to consult the RPGO.

Specific Instructions

- All questions are to be answered. Note the questions within require a mix of descriptions, yes/no answers and cross the box (**Double-click on check boxes with your mouse and select 'Checked' from the options under 'Default Value'**).
- Research Leaders need to review the information in this form and sign it off prior to application being made to the RPGO.
- Please forward one signed original copy to the RPGO, together with an electronic version to research@wintec.ac.nz.
- Low Risk Human Ethics in Research Applications also need to be accompanied by a copy of the Information Sheet, Consent Form, and any Questionnaires or Interview Schedules for consideration. If Questionnaires/ Schedules are not yet confirmed, please supply the latest draft.
- No questions are to be deleted, even those that you feel you are not required to answer.
- No part of the research requiring ethical approval should commence prior to approval being confirmed.
- Applicants will receive an official confirmation of submission via email from the RPGO once all conditions of this form have been completed.
- If you want to apply for an extension on a previously approved project, please contact the RPGO, as you will probably not need to submit a separate application.
- Applicants will be advised of the outcome of their application to the Human Ethics in Research Committee **no later than ten working days** after the completed and confirmed submission of this application.

Attached please find (as applicable) in the order listed below	
Completed HERG Low Risk Application Form	☐ Yes ☐ No
Consent Form for participants	☐ Yes ☐ No
Information Sheet for participants	☐ Yes ☐ No
Copy of Focus Group Questions, Interview Schedule, or similar	☐ Yes ☐ No

HUMAN ETHICS IN RESEARCH LOW RISK APPLICATION FORM - CHECK LIST	
Research project title:	Impact of Social Media on Social Commerce
Name of primary researcher:	**Moni Nagraj**